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NOTES ON THE FLORA OF 'IRAQ WITH KEYS—PART II.*

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Cruciferae

Artificial key to the genera

A. Leaves not amplexicaul (see p. 505)

B. Leaves all simple and entire (see p. 499)

C. Stem leafless scapiform, rosette of leaves up to 2 cm. long, petals yellow or white 2–3 mm. long ; hairs branched† or plant glabrous

D. Annual

E. Petals yellow, truncate or slightly emarginate ; narrow linear siliquas . . . . . *Drabopsis*

E¹. Petals white, bifid ; ovoid to oblong-linear silicules . *Erophila*

D¹. Perennial ; petals yellow, truncate or slightly emarginate ; silicules ovoid . . . . . *Draba pulchella* Willd.

C¹. Stem ± leafy ; other characters various

F. Stem spines stout ; petals mauve ; silicule ± globose mucronate (fig. 3) . . . . . *Zilla*

F¹. Not as above

G. Annual

H. Plant tomentose-stellate ; petals yellow rarely white ; silicule

I. Ovary with 1 ovule ; silicule indehiscent or opening only at apex ; peduncle deflexed ; annual (fig. 33) . . *Clypeola*

I¹. Ovary with 2 or more ovules ; silicule dehiscent ; peduncle erect or spreading ; annual or perennial (fig. 22) . *Alyssum*

*Continued from Kew Bull. no. 3, 467–492 (1954).

†The phrases "plant hairy," "glabrescent" or "hairs branched" etc. refer to the hairs on the vegetative parts of the plant, unless otherwise stated.

H¹ Not as above

J. Glabrous or hairs simple, silicules flattened often winged especially towards apex

K. Inflorescence umbellate in flower and fruit ; petals white (fig. 23) . . . . . *Iberis*

K¹ Inflorescence not umbellate lengthening in fruit ; petals white pink or purple ; plant glabrous . . . . *Aethionema*

J¹ Hairs branched or 2-fid (rarely glabrescent) ; siliqua

L. Hairs on stem and leaves closely adpressed, 2–4-fid, fixed at the middle ; stigma capitate (fig. 44) . . . *Erysimum*

L¹ Hairs on stem and leaves ± spreading fixed at the base

M. Stigma depressed capitate (fig. 41) . . . . . *Maresia*

M¹ Stigma with shortly decurrent lobes (fig. 27) . . *Eremobium*

G¹ Perennial or biennial

N. Glabrous

O. Petals white ; silicule inflated and membranous (fig. 52) *Coluteocarpus*

O¹ Petals white, pink or mauve ; silicules flattened (fig. 13) *Aethionema*

N¹ Hairy

P. Grey with adpressed or silky hairs or plant greenish, hairs 2–4-fid

[Q. Petals yellow to brownish, 14–19 mm. long ; central nectary absent ; siliquas 3–5·5 cm. long, 0·3–0·4 cm. wide *Cheiranthus*]

Q¹ Petals yellow sometimes purple, often smaller ; central nectary present ; siliquas often smaller . . . . *Erysimum*

P¹ Tomentose, hairs stellate ± spreading

R. Petals 10 mm. long or more ; calyx closed with upright sepals

S. Leaves up to 2·5 mm. wide ; basal rosette present or not ; calyx not saccate

T. Basal rosette present ; petals yellow 10–17 mm. long ; silicule ovoid convex smooth 6–8 cm. long ; calyx enlarging in fruit (fig. 11) . . . . . *Clastopus*

T¹ No basal rosette ; petals brownish yellow, 10–18 mm. long; silicule oblong flat rounded at each end, 8–20 mm. long ; calyx deciduous . . . . . *Farsetia*

S¹ Leaves wider; basal rosette present

U. Leaves up to 2 cm. long ; petals yellow ; silicule inflated membranous ; calyx bisaccate (fig. 59)

Physotychis gnaphalodes (DC.) Boiss.

U¹ Leaves over 2 cm. long ; petals yellow or purple ; fruit not inflated

V. Calyx often bisaccate ; petals yellow or purple ; silicule flat orbicular to elliptic oblong (fig. 57) . . *Fibigia*

V¹ Calyx not bisaccate ; petals yellow ; siliqua terete or tetragonous often constricted between seeds (fig. 43) *Anchonium*

R¹ Petals up to 3·5 mm. long, yellow or white ; calyx open or closed, sepals spreading-erect . . . . . *Alyssum*

B¹ At least some of the leaves more or less dentate or pinnatisect (rarely palmatisect)

X. Radical and lower stem leaves ± reniform to triangular-ovate to elliptic, cordate at base, sinuate-dentate, long petiolate ; petals white 3–7 mm. long ; calyx spreading

Y. Perennial ; silicule indehiscent membranous very flat, 2–4 ovulate but generally 1-seeded when mature

Z. Rootstock thick perennial with many dead persistent leaf-bases ; lower stem and radical leaves reniform, upper stem leaves cordate or rounded at base, petiole long (or absent) ; silicule lanceolate to obovate often arcuate-oblique (fig. 20) . *Graellsia*

Z¹ Rootstock thin without persistent leaf-bases ; lower stem and radical leaves ovate to elliptic, upper stem-leaves lanceolate to linear-lanceolate tapering at base ; silicules orbicular (fig. 34) *Peltaria*

Y¹ Annual or biennial, dead petiole-bases few or absent ; siliqua

1. Annual ; radical and lower stem leaves ± triangular-ovate ; siliquas spreading or deflexed, tapering towards apex generally arcuate up to 10 mm. long, 2 mm. wide, somewhat flattened (fig. 26) . . . . . *Parlatoria cakiloidea* Boiss.

1¹ Biennial ; radical and lower stem-leaves ± reniform to triangular ovate ; siliquas erect spreading, linear, 20–65 mm. long *Allioria*

X¹ Not as above ; lower leaves not cordate

2. Glabrous perennials up to 15 cm. tall ; sepals often purple, 4–8 mm. long ; silicules membranous inflated

3. Basal rosette present ; leaves simple linear to oblanceolate ; petals white 6–8 mm. long ; silicule 20–30 mm. long (fig. 52) *Coluteocarpus*

3¹ No basal rosette ; leaves 3–5-palmatisect ; petals pink 4–6 mm. long ; silicule 3–11 mm. long (fig. 31) . . . . *Didymophysa*

2¹ Not as above

4. Calyx short c. 2 mm. long or less, open with spreading sepals

5. Glabrous perennial 50–130 cm. tall ; leaves simple to ovate to lanceolate (rarely pinnatisect) not cordate at base, long-

petiolate ; flowers numerous in rather dense clusters, petals white 1·5–2 mm. long ; silicule not inflated c. 2 mm. long (fig. 9) *Lepidium latifolium* L.

5¹ Not as above

6. Petals white with conspicuous dark veins ; silicule deflexed 6–9 mm. long with a globose lower portion and a much flattened beak like upper portion ; leaves much pinnatisect terminal lobe rarely larger than others ; hispid annual (fig. 21) *Carrichtera annua* (L.) Asch. et Schw.

6¹ Petals not veined ; other characters various

7. Silicule

8. Silicule warty reticulate ; glabrescent annual ; leaves much pinnatisect ; petals white 1–1·5 mm. long . . *Coronopus*

8¹ Silicule smooth ; other characters various

9. Silicule ± flattened; petals never yellow; annual or biennial

10. Silicule dorsally flattened (replum in widest diam.), unwinged elliptic 6–17 mm. long, style present ; plant viscid and hairy below glabrescent above ; petals 4–5 mm. long ; lower leaves sinuate-crenate, spathulate-oblong (fig. 15) . . *Savignya parviflora* (Del.) Webb

10¹ Silicule laterally flattened (replum in the narrowest diam.) ; plant not viscid, glabrescent ; petals often smaller ; leaves pinnatisect, segments linear to oblong

11. Style present ; silicule 2–6 mm. long winged at apex emarginate (fig. 8) . . . . . *Lepidium*

11¹ Style absent ; silicule c. 2 mm. long not conspicuously winged

12. Petals none ; raceme dense (bases of all peduncles under 2 mm. apart) ; silicule emarginate *Lepidium ruderale* L.

12¹ Petals white (rarely yellow) under 1 mm. long ; raceme looser (bases of lower peduncle well over 2 mm. apart) ; silicule not emarginate . *Hymenolobus*

9¹ Silicule ovoid ± terete ; petals white or yellow

13. Petals white under 1 mm. long ; leaves simple ; silicule hairy subsessile, style acute curved outwards ; annual with branched hairs (fig. 4) *Euclidium syriacum* (L.) R. Br.

13¹ Petals yellow or white, larger ; peduncles longer than silicules ; leaves simple to pinnatisect

14. Large coarse perennial with spreading panicle ; glabrescent or hispid ; petals 3–5 mm. long yellow or white ; silicule indehiscent with globose upper portion (no style) and a small narrow seedless lower portion (fig. 2) *Crambe*

14.1 Glabrous marsh perennial ; petals yellow ; silicule with ± straight style ; stigma capitate sub-bilobed wider than style (fig. 37)

Nasturtium amphibium (L.) Br.

7.1 Siliqua

15. Leaves simple or, when pinnatisect, then terminal lobe not larger than the others

16. Glabrescent or with simple hairs ; leaves pinnatisect segments ± linear ; petals purple, pink or rarely white ; siliquas striate wider, divided into 2 parts

Erucaria and *Reboudia*

16.1 Branched and simple hairs ; leaves simple to serrate-pinnatisect, segments ± triangular, petals white (sometimes with a purple claw) ; siliquas less striate, under 1 mm. wide, not divided transversely into two parts (fig. 28)

Torularia

15.1 Leaves pinnate or pinnatisect

17. Leaf-segments triangular elliptic, oblong or orbicular, terminal lobe the largest

18. Glabrous aquatic perennial ; no basal rosette ; petals white ; siliqua oblong not beaked (fig. 36)

Nasturtium officinale

18.1 Annual with simple hairs towards base ; basal rosette present ; petals yellow, whitish sometimes with a purple claw ; siliqua linear beaked 2–3·5 mm. wide

Brassica tournefortii Gouan

18.2 Glabrescent or somewhat hairy annuals or biennials ; stem leafy, basal rosette often absent ; petals yellow (rarely white ?) ; siliqua linear without a beak under 2 mm. wide . . . . . *Sisymbrium*

17.1 Leaf-segments ± linear ; glabrescent or with simple hairs; petals purple, pink, rarely white ; siliquas transversely divided into two portions . . . . . *Erucaria*

4.1 Calyx longer, often closed with erect sepals

19. Leaves pinnate, leaflets pinnatisect ; petals yellow ; siliquas not beaked . . . . . *Descurainia*

19.1 Not as above

20. Not tomentose, generally annual (see p. 504)

21. Silicule ; petals yellow

22. Silicule flat, two-lobed, lobes orbicular ; hispid annual with simple hairs (fig. 25) . . . . . *Biscutella*

22.1 Silicule ovoid assymetrical verrucose, style oblique ; large annual to perennial with sparse short stiff dark glandular tubercles . . . . . *Bunias*

21[1]. Siliqua ; petals various

23. Hairs branched ; petals not veined ; siliqua linear not beaked

24. Siliqua with 2 horns near apex ; annual (fig. 50) *Matthiola*

24[1]. Siliqua without 2 horns near apex

25. Annual

26. Leaves pinnatisect, segments linear, terminal segment not enlarged (fig. 38) . *Leptaleum filifolium* (Willd.) DC.

26[1]. Leaves wider

27. Stigma with decurrent lobes ; calyx often longer (fig. 45) . . . . . *Malcolmia*

27[1]. Stigma depressed capitate ; calyx up to 5 mm. long (fig. 41) . . . . . *Maresia*

25[1]. Perennial, plants generally larger . . . . . *Hesperis*

23[1]. Hairs simple or plant glabrescent

28. Petals with conspicuous dark veins (fig. 58) . *Raphanus*

28[1]. Petals not veined

29. Leaves pinnatisect with ± linear segments, terminal lobe not or rarely the largest

30. Siliquas divided into 2 parts ; plants often larger

31. Style present ; lower part of fruit with 1–12 ovules, 2-valved, upper with 1–4 ovules ; siliqua usually much constricted between seeds *Erucaria* and *Reboudia*

31[1]. Style absent ; lower part of fruit with 1 rarely 2 ovules, not 2-valved, upper part with 1 rarely 2 ovules *Cakile*

30[1]. Siliquas spreading not divided into 2 parts nor beaked, no style ; annual up to 15 cm. tall generally less and generally bearing flowers very near the base (fig. 38) *Leptaleum filifolium* (Willd.) DC.

29[1]. Leaves simple or, if pinnatisect, then segments wider, terminal segment the largest

32. Silicule membranous inflated ; glabrous perennial ; leaves linear to oblanceolate ; petals white *Coluteocarpus*

32[1]. Not as above ; siliqua

33. Siliqua terete, breaking into joints, style in fruit 10–27 mm. long (fig. 60) . . . . . *Chorispora*

33[1]. Siliqua ± flattened or terete, opening by two valves beaked or not, or breaking transversely into joints

34. Petals lilac or white with purple claws ; siliqua flat up to 4·5 cm. long, valve 1-nerved, beak 1–3 mm. long ; seeds 2-seriate (fig. 49) . . . *Diplotaxis*

34[1]. Not as above ; seeds 1-seriate

35. Petals pink, purple or brownish ; siliqua without a long beak, valve many-nerved . . . . *Hesperis*

35[1]. Petals white ; siliqua beak 10–23 mm. long, valve 1-nerved . . . . . *Brassica tournefortii*

35[2]. Petals yellow

36. Petals with conspicuous dark veins ; siliqua beaked, opening longitudinally by 2 valves (fig. 35) *Eruca sativa* Mill.

36[1]. Petals not conspicuously veined

37. Siliqua opening by 2 longitudinal valves from below

38. Siliqua adpressed

39. Siliquas 1–2 cm. long

40. Peduncle not thickened ; beak of siliqua thinner than siliqua, seedless ; valve of siliqua " 1-nerved " (with thick middle nerve and much thinner lateral ones) (fig. 32) *Brassica nigra* (L.) Koch

40[1]. Peduncle thickened ; beak as thick as siliqua often containing seeds ; valve obscurely 3-nerved ; plant usually more hairy (fig. 39) *Hirschfeldia incana* (L.) Lag.-Foss.

39[1]. Siliquas longer, with long tapering beak with seeds at base, valves 3–7-nerved (fig. 42) *Sinapis*

38[1]. Siliquas spreading or deflexed

41. Young siliquas stipitate (stipe 1·5–4 mm. long), siliquas " 1-nerved "

42. Stem glabrous at base (rarely sparsely hispid) ; leaves simple, narrow oblong very cuneate at base, sinuate-dentate ; siliquas erect-spreading, valves convex very torulose ; seeds 1-seriate *Brassica elongata* Ehrh.

42[1]. Stem hispid at base (rarely glabrous) ; leaves often wider more sharply toothed ; siliquas deflexed, valves flat slightly torulose ; seeds 2-seriate . . *Diplotaxis harra* (Forsk.) Boiss.

41! Young siliquas not or shortly stipitate (stipe up to 1·2 mm. long)

43. Young siliquas exceeding the flowers *Sisymbrium*

43! Young siliquas not exceeding the flowers

44. Peduncles incrassate as thick as siliqua ; leaves sometimes hastate or with narrow linear segments ; style of fruit up to 5 mm. long . . . . . *Sisymbrium*

44! Peduncles not incrassate ; other characters various

45. Siliquas spreading-arcuate, up to 1 mm. wide ; style up to 1 mm. long ; terminal lobe of leaf often hastate *Sisymbrium loeselii* L.

45! Not as above ; siliquas spreading or deflexed, sometimes wider ; beak 3 mm. or more long ; leaves not hastate nor divided into linear segments

46. Valves of siliqua " 1-nerved " with a thick middle nerve and much thinner lateral ones (fig. 48) *Brassica*

46! Valves of siliqua with a thick middle nerve and only slightly thinner lateral ones (fig. 42) *Sinapis*

37! Fruit breaking transversely into joints or not opening

47. Fruit erect adpressed, divided into two parts, upper part ± globose thicker than lower, style present (fig. 18) . . . . . *Rapistrum*

47! Fruit deflexed, more elongated constricted between seeds then breaking into joints *Raphanus aucheri*

20! Perennial ; tomentose

48. Sterile rosettes of leaves present ; petals 10–15 cm. long, white ; siliqua narrow linear . . . . . *Arabis*

48! Not as above

49. Petals c. 5 mm. long, white or lilac ; prostrate weak-stemmed perennial ; silicule up to 10 mm. long (excluding style) ; leaves up to 2·5 cm. long (fig. 16) . . *Aubrieta*

49! Petals larger ; erect herb, leaves larger

50. Plant stellate tomentose ; siliqua or silicule

51. Petals 7–10 mm. long, yellow ; siliqua terete (fig. 54) *Sterigmostemum sulphureum* (Banks et Sol.) Bornm.

51¹ Petals 6–19 mm. long, yellow or purple ; silicule flat (fig. 57) . . . . . *Fibigia*

50¹ Plant usually hispid or glandular rarely subtomentose, petals pink, purple or brownish ; siliqua . . *Hesperis*

A¹ At least some of the leaves amplexicaul

b. Leaves all simple and entire

c. Hairs 2- or 3-fid ; annual ; petals yellow or white

d. Inflorescence very dense ; petals greenish-yellow or white, 1·5–2 mm. long ; hairs adpressed 2-fid ; fruit linear-oblong with two horns at apex (fig. 29) . . . . . *Notoceras*

d¹ Inflorescence loose, flexuose ; petals yellow 2–3 mm. long ; hairs 3-fid not adpressed ; fruit without horns, ovoid elliptic (fig. 14) *Chrysochamela*

c¹ Glabrous or glabrescent ; other characters various

e. Petals yellow

f. Calyx closed ; fruit erect-spreading

[Silicules adpressed erect incrassate clavate mucronate with two large empty rounded loculi towards apex (fig. 1) . *Myagrum*]

Siliquas linear, erect-spreading (fig. 53) . . . . *Conringia*

f¹ Calyx open ; fruit ± flattened reflexed

Ovary with 2 ovules, style absent (fig. 51, 56) . . *Isatis*

Ovary with 1 ovule, style present (fig. 55) . . . *Sameraria*

e¹ Petals not yellow

g. Filaments (at least the inner) winged or toothed ; margin of silicule entire to fimbriate ; petals pink, purple or white ; annual or perennial not fibrous ; radical leaves absent or not petiolate . . . . . *Aethionema*

g¹ Filaments not widened ; margin of silicule entire or subentire ; petals white or pink ; annual or perennial

h. Perennial ; petals pink or purple 5–7 mm. long ; fibres (old petioles) at base ; radical leaves with a distinct petiole (figs. 46, 47) . . . . . *Brossardia*

h¹ Annual ; petals white, c. 3 mm. long (fig. 24) . . *Thlaspi*

b¹ Leaves, at least some of them, ± dentate to pinnatisect

i. Hairs branched

j. Inflorescence flexuose ; petals yellow ; silicule ovoid-elliptic (fig. 14) . . . . . *Chrysochamela*

j.[1] Inflorescence rhachis not flexuose

k. Petals 10–20 mm. long ; siliqua

l. Petals white . . . . . *Arabis caucasica* Willd.

l.[1] Petals yellow or purple . . . . . *Malcolmia*

k. Petals 1–8 mm. long ; siliqua or silicule

m. Petals white

n. Petals 2–7 mm. long, siliqua . . . . . *Arabis*

n.[1] Petals 1–3 mm. long ; silicule laterally flattened, smooth, obcordate-triangular (fig. 7) . . . . . *Capsella*

m.[1] Petals yellow

o. Petals 2–3 mm. long ; silicule biconvex ± reticulate, often 4-ribbed (fig. 5) . . . . . *Neslia*

o.[1] Petals 6–8 mm. long ; silicule obovate, smooth, biconvex with a distinct margin (fig. 10) . . . . . *Camelina*

o.[2] Petals 1·5–2 mm. long ; siliqua . . . . . *Arabidopsis*

i.[1] Hairs simple or plant glabrescent

p. Petals pink

q. Peduncles reflexed ; curved siliqua c. 10 mm. long, 2–3 mm. wide ± constricted at intervals, with 4 longitudinal ribs ; leaves dentate to pinnatifid (fig. 30) . . . . . *Goldbachia*

q.[1] Peduncles not reflexed ; siliqua linear up to 1·5 mm. wide

r. Leaves pinnate . . . . . *Cardamine*

r.[1] Leaves simple . . . . . *Malcolmia*

p.[1] Petals not pink

s. Petals white

t. Silicule

u. Silicule ovoid reticulate with short obtuse apex ; ovary with one ovule ; peduncle erect-spreading (fig. 6) *Calepina irregularis* (Asso) Thell.

u.[1] Not as above

v. Silicule winged, apex emarginate, dehiscent ; annual (fig. 24) *Thlaspi*

v.[1] Silicule unwinged

w. Silicule obcordate-triangular, apex emarginate ; annual or biennial (fig. 7) . . . . . *Capsella*

w.[1] Silicule orbicular to obovoid, apex not emarginate ; perennial (fig. 19) . . . . . *Cardaria*

t.[1] Siliqua . . . . . *Cardamine*

s.[1] Petals yellow

x. Silicule or, if fruit longer, then only 1–2 seeded

y. Fruit reflexed ; peduncles longer or shorter than fruit

z. Fruit ± flattened

Ovary with 2 ovules ; style absent (fig. 51, 56) . . *Isatis*

Ovary with one ovule ; style present (fig. 55) . *Sameraria*

z.[1] Silicule ovoid, smooth not flattened (fig. 17) *Texiera glastifolia* (DC.) J. et S.

y.[1] Peduncles adpressed erect, shorter than silicule

* [Silicules incrassate-clavate mucronate with two large empty loculi towards apex ; mucro straight (i.e. in line with the peduncle) (fig. 1) . . . . . *Myagrum*]

** Silicules ± arcuate, basal part tuberculate ± ovoid, sterile upper part much flattened spreading out at an angle from the peduncle (fig. 12) . . . . . *Schimpera*

x.[1] Not as above ; siliqua many-seeded opening by two valves

† Annual, branched at base, up to 16 cm. tall ; leaves simple *Malcolmia exacoides*

†† Not as above ; plant generally taller, branched in upper part ; leaves pinnate to simple

Uppermost stem-leaves lobate-dentate, widest at or above the middle ; siliquas up to 1·5 mm. wide (fig. 40) . . *Barbarea*

Uppermost stem-leaves subentire or slightly dentate, widest below middle ; siliquas wider . . . . . *Brassica*

As in other natural families it is very difficult to give a satisfactory key to the genera of *Cruciferae*. The major divisions are the main problem as it is almost impossible to find any one character which separates the genera into two, let alone four approximately equal parts. The characters which were tried but abandoned were the time-honoured siliqua (pod about 3–4 or more times as long as wide) as opposed to silicule (pod short, not 3–4 times as long as wide). Species with oblong pods (*Fibigia* spp., *Schimpera*) or with and short pods in the same genus (*Nasturtium*, *Isatis*) make this division awkward. The presence of branched (bifid and stellate) hairs as well as simple hairs, in contrast with all simple hairs is a useful character in this family and may have some phylogenetic significance (e.g. branched hairs are absent in the *Brassiceae* sensu Schulz).

Unfortunately this character, although clear enough in many species, is not always very readily observable ; in the key above, where this character is used, the difficult genera have been placed in both branches of the key. Petal-colour, although a good field character, is sometimes useless in the herbarium as yellow-flowered Crucifers often dry with their petals whitish and field-notes are often absent. Although yellow and pink to purple flowers seldom occur in the same genus this is not always so, as the yellow-flowered *Malcolmia exacoides* and the purple-flowered *Erysimum oleifolium* show. The cotyledonary characters on which Boissier (pp. 139–142 : 1867) and others relied on for their classification are again too minute for use in the field. Nor are they always constant in one species as Burtt and Lewis (in Kew Bull. 288–9 : 1949) show in *Erucaria hispanica*. Annual, biennial or perennial is a convenient distinction in some genera but in others it is difficult to decide without cultivation, and the basal parts are too often absent on herbarium specimens.

An artificial key should use characters which (1) are readily observable in fresh and dried material and (2) are vegetative as far as possible so that either flowering or fruiting material can be named. Their constancy throughout a single genus is of less importance, as in an artificial key as opposed to a natural or phylogenetic classification, there is no objection to the same genus appearing in two or more major divisions of the key. For these reasons, leaf-shape has been much used in the key above. Although there are many species in which the leaf varies from simple and dentate to pinnatisect there are relatively few in which simple and entire-margined leaves vary to dentate or pinnatisect. Amplexicaul leaves are constant in many genera although both amplexicaul and not amplexicaul leaves are found in *Malcolmia* and *Brassica* and even in the one species *Arabis hirsuta*. Duration, indumentum and floral characters are used next. Flower diameter might be a better field character than petal length but the latter can also be readily used in the herbarium. The fruit characters, by which the genera of Cruciferae are best defined, are only used in the later branches of the key. As far as possible characters which can be seen in young as well as in mature fruit are given. Anyone trying to identify a specimen from riper fruits should refer to the illustrations, which have been drawn by Miss Halliday.

One disadvantage of an artificial key is that it often gives a very confused idea of each genus, and some consideration of a more natural classification of the *Cruciferae* is not out of place here. The same difficulty as confronts the compiler of an artificial key also applies to any attempt at phylogeny. That the same character often occurs in two or more genera not otherwise closely related is shown by the diversity of classifications given in the standard floras and works on systematic botany (see also Turrill in Journ. Bot. **77,** 119–125 : 1939). This tendency may be illustrated in the Iraqi flora by the following :—the small scapiform habit in *Drabopsis* and *Draba*, petals with dark pigmented veins in *Eruca*, *Carrichtera* and *Raphanus*, inflated bladder-like silicules in *Didymophysa*, *Coluteocarpus* and *Physotychis*, long-petiolate simple radical leaves in *Alliaria*, *Graellsia*, *Parlatoria* and *Peltaria*. This might be taken as either evidence of convergent evolution or of past introgressive hybridity or even of mimicry and there seems no evidence, at least in the Cruciferae, to show which is the correct theory.

Invaluable work on the *Cruciferae* has been published by O. E. Schulz in Pflanzenfam. **17B,** 266–291 (1936) giving keys and descriptions down to the rank of genus. His accounts of some of the tribes and genera in the Pflanzenreich contain keys and descriptions to the species and varieties as well and have been much used for the genera concerned ; Brassiceae **70,** IV, 105 : 1919 ; Sisymbreae **86,** IV, 105 : 1924 ; *Draba* and *Erophila* **89,** IV, 105 : 1927. The key to the genera given by Schulz, it must be pointed out, is a summary of a classification rather than a key intended to do no more than facilitate identification. Many of the characters used are highly technical and reduced forms are included in the tribes from which they are derived. For example *Calepina*, *Crambe*, *Zilla* and *Savignya* which do not appear superficially to have a beak-like upper division to the fruit are in the *Brassiceae*. *Schimpera* and *Euclidium*, on the other hand, which have, at least as far as external shape is concerned, a marked ' beak ' are placed in the tribe *Euclideae*.

In the delimitation of the genera Schulz has been followed.

In preparing these notes on the flora of 'Iraq I am indebted to Mr. J. B. Gillett for much help and advice, especially on the localities and also to Mr. J. P. M. Brenan.

Enumeration and keys to species

In this enumeration, species are only listed when they were not given in the " The Rustam Herbarium, 'Iraq " in Kew Bull. 383–395 (1948) or where some additional note is needed. On the other hand, all the species so far known from 'Iraq are dealt with in the keys.

The herbarium of the Department (now Ministry) of Agriculture, Baghdad first called the Rustam Herbarium and now the National Herbarium of 'Iraq has been given by Lanjouw (Index Herbariorum 18 : 1954) a standard international abbreviation BAG. Since the collectors (principally Guest, Rawi and Gillett) have up till now used the serial number of this herbarium starting with 1 in 1920 and reaching 13000 in 1953, numbers have been cited as for instance, *Guest* 884 or *Gillett* 6602. These should strictly speaking be cited as " *Guest* in BAG 884 " or "*Gillett* in BAG 6602". The exception to this remark is R. Wheeler Haines (1954) who has used a series of numbers of his own on the National Herbarium of 'Iraq labels ; these are cited as e.g. *Haines* W35. Unless otherwise stated all specimens referred to in this paper are at Kew and to save space, the abbreviation K. for Kew will not be usually used, but the appropriate abbreviation will be employed whenever it is necessary to refer to a specimen in some other herbarium. The letter (K.) following a native name was used in " The Rustam Herbarium, 'Iraq " l.c. for Kurdish.

Aethionema R. Br.

A. Annuals

B. Margin of silicule-wing toothed or crenulate

C. Flowers c. 2 mm. long ; wing of silicule flat with lacerate-dentate margin teeth acute ; style under 1 mm. long

A. carneum (Banks et Sol.) B. Fedtsch.

C.[1] Flowers 3–5 mm. long ; wing of silicule curved upwards with a crenulate margin teeth obtuse ; style 2–3 mm. long
A. campylopterum Boiss.

B.[1] Margin of silicule entire or subentire ; flowers c. 2 mm. long ; style under 1 mm. long . . . . . *A. arabicum* (L.) Andrz.

A.[1] Perennials

D. Silicule unwinged ; upper stem leaves cordate at base, secondary nerves conspicuous . . . . . *A. trinervium* (DC.) Boiss.

D.[1] Silicule winged ; leaves with inconspicuous nerves

E. Margin of silicule-wing fimbriate-lacerate ; leaves oblong-elliptic (fig. 13) . . . . . *A. schizopterum* Boiss. et Haussk.

E.[1] Margin of silicule sinuate to dentate ; leaves linear spathulate

F. Silicule up to 8 mm. long, 7 mm. wide, wings curved upwards
A. coridifolium DC.

F.[1] Silicule 10–14 mm. long, 10–15 mm. wide, wings flat or only crisped at margin . . . . *A. grandiflorum* Boiss. et Hoh.

Flower colour is not a very useful specific character in this genus, as in *A. carneum* it varies from white to rose and to purple, while in *A. campylopterum* it is white, white tinged with lilac or flesh-coloured (" carneis ").

There are notes on heterocarpy in this genus by Handel-Mazetti p. 55 (1913) and by Zohary in Pal. Journ. Bot. ser. J., **4,** 28–29 (1949).

In addition to the species given in the key above Zohary p. 72 (1950) mentions another species as a *nomen nudum.*

Aethionema arabicum *(L.) Andrz.* (*A. buxbaumii* (Fisch.) DC.)

Bornmüller p. 120 (1911) cites " Riwandus [Rowanduz], Abhange des Händarin, 1300 m. (13.VI.1893 ; no. 905) ". Handel-Mazetti p. 55 (1913) records it also from " Gesteinfluren des Dschebel Sindschar [Jabal Sinjar] ober der Stadt, 600–700 m. (Nr. 1357)".

The densely imbricate silicules distinguish this from *Thlaspi perfoliatum* and *T. kotschyanum* which it otherwise much resembles. In these species of *Thlaspi* the silicules are spreading or erect-spreading.

A. coridifolium *DC.*

In rupestribus septentrionem versus sitis m. Gara Kurdistan, 6.8.1841, *Kotschy* 378.

This number is cited by Boissier **1,** p. 846 (1867) as *A. pulchellum,* but it matches his description and other cited specimens of *A. coridifolium.* Possibly Kotschy collected more than one species under this number.

A. grandiflorum *Boiss. et Hoh.*

Pir Omar Gudrun, Kurdistan, 4000 ft., June 1867, *Haussknecht* ; in montis Kuh-Sefin (ditionis Erbil) [Arbil] regione superiore 16–1800 m. et reg. infer. supra pagum Schaklava [Shaqlawa], 1200 m., 21 et 28.5.

1893, *Bornmüller* 908 ; Ruwandous [Rowanduz], m. Sakri-Sakran, 1700 m., 20.6.1893, *do.* 910 ; Sefin Dagh above Shaqlawa, Arbil liwa, 1300 m. and over, limestone mt. with *Quercus* forest, on rocky places, common, magenta, very handsome, 9.5.1947, *Gillet* 8145 ; Matina, Mosul liwa, 1700 m., 15.5.1947, *Rawi* 8663 ; Sefin Dagh above Shaqlawa, 1300 m., limestone mt. with *Quercus* forest, 19.6.1947, *Rawi* 9106 ; Haji Omran near Hotel, Arbil liwa, 1800 m., slates of Nappe zone above tree level, purple, 3.6.1948, *G. Chapman* 11950.

There is some variation in this material, some of which approaches *A. pulchellum* Boiss. et Huet. As this group of *Aethionema* is a critical one, and as *A. pulchellum* may not be specifically distinct, it seems best to include all the 'Iraq material under *A. grandiflorum.* Bornmüller p. 119 (1911) writes that a sharp division between these two species does not exist.

A. trinervium (*DC.*) *Boiss.*

Kodo near Haji Omran, Arbil liwa, 2700 m., igneous or metamorphic rock, white, 22.6.1947, *Rawi* 9211.

Alliaria petiolata (*MB.*) *Cavara et Grande* (*A. officinalis* DC.).

Zohary (in Pal. Journ. Bot. ser. J., **4,** 235 : 1949) records this from the Jabal Sinjar and the Rowanduz area.

Alyssum *L.*

A. Perennial ; 1–2 ovules in each loculus ; silicules hairy

B. Petals 2–3·5 mm. long ; one ovule in each loculus

C. Infl. in fruit dense 1–3 cm. long, 1–2·5 cm. wide ; stamens various

D. Appendages of 4 longer stamens 2–3-dentate at apex
A. condensatum Boiss. et Haussk.

D.¹ Appendages of 4 longer stamens entire . *A. lanigerum* DC.

C.¹ Infl. in fruit lax 1·5–7 cm. long, c. 1·5 cm. wide ; appendages of 4 longer stamens 2–4 dentate at apex
A. singarense Boiss. et Haussk.

B.¹ Petals c. 5 mm. long, about twice as long as calyx ; 2 ovules in each loculus . . . . . *A. mulleri* Boiss. et Buhse

A.¹ Annual ; 1–6 ovules ; silicules hairy or glabrous

E. Petals twice as long as calyx ; silicule stellate hairy ; style 1–2 mm. long

F. Silicules hairy ; 2 ovules in each loculus

G. Petals white ; style 2–3 mm. long
A. pseudocalycinum Zohary

G.¹ Petals yellow ; style 1–1·5 mm. long
Alyssum sp. (*Mooney* 4261, *Gillett & Rawi* 20506)

F.¹ Silicules glabrous ; 4–6 ovules in each loculus
A. aureum Fenzl.

E.[1] Petals shorter often little longer than calyx

H. Silicules convex ; 2 (rarely 1) ovule in each loculus

I. Silicules hairy

J. Infl. in fruit dense, peduncles strict

K. Silicules imbricate ; style up to 0·75 mm. long

L. Infl. in fruit, 0·8–1·5 cm. wide ; longer filaments not dentate . . . . . *A. szowitsianum* F. et M.

L.[1] Infl. in fruit 0·4–0·8 cm. wide ; longer filaments with a 2-dentate appendage . . . . *A. strictum* Willd.

K.[1] Silicules not imbricate ; style 1·5–2 mm. long *A. dasycarpum* Steph.

J.[1] Infl. in fruit laxer, peduncles ± spreading

M. Calyx deciduous ; style 0·7–2 mm. long

N. Only stellate hairs on silicule . . *A. parviflorum* Fisch.

N.[1] Long simple on silicule as well as stellate hairs *A. parviflorum* var. *hirsutum* (MB.)

M.[1] Calyx persistent ; style up to 0·5 mm. long *A. alyssoides* (L.) L.

I.[1] Silicules glabrous

O. Silicules markedly convex, widest about the middle 2·5–4 mm. long and wide ; style c. 0·5 (0·75) mm. long, generally with lower peduncles as long as or longer than fruit . . . . . *A. desertorum* Stapf

O.[1] Silicules less markedly convex, widest above the middle, 4–5 mm. long, 3–6 mm. wide ; style 0·75–1 mm. long ; lower peduncles shorter than silicule *A. homalocarpum* F. et M.

H.[1] Silicules flat, glabrous ; 4–6 ovules in each loculus

P. Petals pale yellow, 1–1·5 mm. long ; style under 0·5 mm. long *A. linifolium* Stev.

P.[1] Petals yellow, c. 2 mm. long ; style 0·5–0·75 mm. long *A. menicoides* Boiss.

A. alyssoides (*L.*) *L.* (*A. calycinum* L.).

Anthony p. 280 (1935) cites a specimen from Jabal Hamrin.

Distr. C. & S. Eur., Cauc., Asia Minor, Syria (introduced in Britain and New Zealand).

A. aureum (*Fenzl*) *Boiss.*

Djebel Taktak, Assyriae [in 'Iraq ?], July 1867, *Haussknecht* ; almost certainly near Mosul or Kirkuk, *coll.* ?

Boissier **1,** p. 286 (1867) describes the petals as " citrinis ".

Distr. Asia Minor, Pal., Syria.

FIG. 1. Cruciferae of 'Iraq ; lateral or dorsal and apical view of fruit (× 3).

1. *Myagrum perfoliatum* L.
2. *Crambe orientalis* L.
3. *Zilla spinosa* (Turra) Prantl.
4. *Euclidium syriacum* R. Br.
5. *Neslia apiculata* F.M. et Avé-Lall.
6. *Calepina irregularis* (Asso) Thell.
7. *Capsella bursa-pastoris* (L). Med.
8. *Lepidium aucheri* Boiss.
9. *Lepidium latifolium* L.
10. *Camelina hispida* Boiss.
11. *Clastopus vestitus* (Desv.) Boiss. var. *eriocarpus* var. nov.
12. *Schimpera arabica* Hochst. et Steud.

FIG. II. Cruciferae of 'Iraq ; lateral or dorsal and apical view of fruit (× 3).

13. *Aethionema schizopterum* Boiss. et Hausskn.
14. *Chrysochamela velutina* (DC.) Boiss.
15. *Savignya parviflora* (Del.) Webb.
16. *Aubrieta parviflora* Boiss.
17. *Texiera glastifolia* (DC.) J. & S.
18. *Rapistrum rugosum* (L.) All.
19. *Cardaria chalepense* (L.) Hand.-Mazz.
20. *Graellsia saxifragifolia* (DC.) Boiss.
21. *Carrichtera annua* (L.) Asch. et Schw.
22. *Alyssum singarense* Boiss. et Haussk.
23. *Iberis odorata* L.

FIG. III. Cruciferae of 'Iraq ; lateral and apical view of fruit (× 3) and in *Eremobium* (× 6).

24. *Thlaspi kotschyanum* Boiss. et Hausskn.
25. *Biscutella ciliata* DC. var. *applanata* Mach.-Laur.
26. *Parlatoria cakiloidea* Boiss.
27. *Eremobium aegyptiacum* (Spreng.) Hochr.
28. *Torularia tetracmoides* (Boiss. et Haussk) O. E. Schulz.
29. *Notoceras bicorne* (Ait.) Amo.
30. *Goldbachia laevigata* (MB.) DC. var. *ascendens* Boiss.
31. *Didymophysa aucheri* Boiss.
32. *Brassica nigra* (L.) Koch.
33. *Clypeola lappacea* Boiss.
34. *Peltaria angustifolia* DC.

FIG. IV. Cruciferae of 'Iraq ; lateral or dorsal and apical view of fruit (× 3) and enlargement of apex in *Maresia* (× 6).

35. *Eruca sativa* Mill.
36. *Nasturtium officinale* R. Br.
37. *Nasturtium amphibium* (L.) R. Br.
38. *Leptaleum filifolium* (Willd.) DC.
39. *Hirschfeldia incana* (L.) Lag.-Foss.
40. *Barbarea plantaginea* DC.
41. *Maresia pulchella* (DC.) O. E. Schulz.
42. *Sinapis arvensis* L.
43. *Anchonium elichrysifolium* (DC.) Boiss. var. *tournefortii* (Boiss.) Bornm.

FIG. V. Cruciferae of 'Iraq ; lateral or dorsal × 1 , apical view of fruit (× 3 , andenlargement of apex in *Malcolmia* (× 6).

44. *Erysimum gladiiferum* Boiss. et Haussk.
45. *Malcolmia crenulata* Boiss.
46 and 47. *Brossardia papyracea* Boiss.
48. *Brassica deflexa* Boiss. var. *lasiocalycina* (Boiss. et Hausskn.) O. E. Schulz.
49. *Diplotaxis acris* (Forsk.) Boiss.
50. *Matthiola oxyceras* DC. var. *forcipifera* Boiss.
51. *Isatis latisiliqua* Stev.
52. *Coluteocarpus vesicaria* (L.) Holmb. var. *boissieri* Hausskn.
53. *Conringia clavata* Boiss.
54. *Sterigmostemum sulphureum* (Banks et Sol.) Bornm.

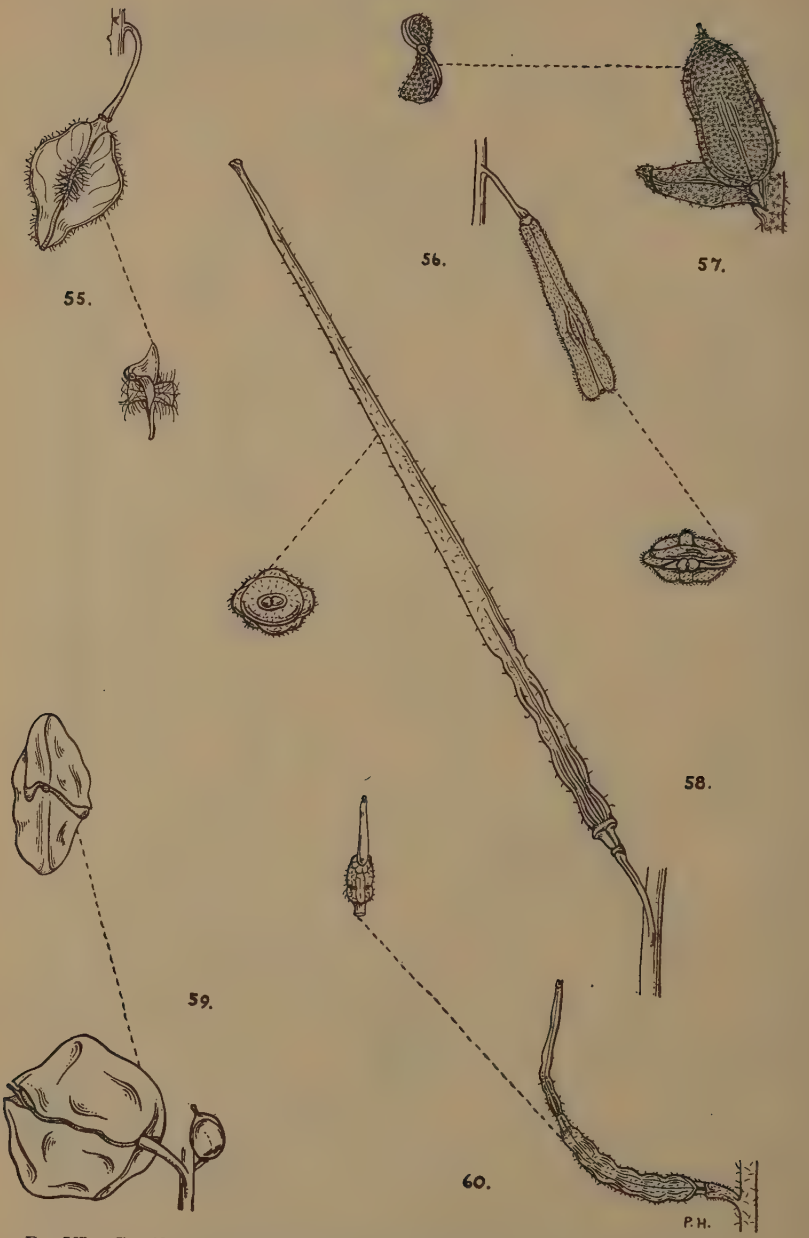

FIG. VI. Cruciferae of 'Iraq ; lateral or dorsal and apical views of fruit (all × 1, except apical views of *Isatis* and *Raphanus* × 3).

55. *Sameraria* sp. (Rawi 11528).
56. *Isatis aleppica* Scop.
57. *Fibigia clypeata* (L.) Medik.
58. *Raphanus rostratus* DC. var. *pugioniformis* (Boiss.) O. E. Schulz.
59. *Physotychis gnaphaloides* (DC.) Boiss.
60. *Chorispora purpurascens* (Banks et Sol.) Eig.

A. condensatum *Boiss. et Haussk.* ?

Nábělek p. 29 (1923) records this from " ad pagum 'Ain Nune inter Amadia et Hasitha, alt. 1200 *m.*, 16.VI.1910 (No. 1368) ; in valle " Sapna " ad pagum Babuchki inter pagos Zacho (Azach) et Amadia alt. 1000 *m.* 23.VI.1910 (No. 1265). Racemi fructifer elongati, siliculae infra attenuatae, ad stylum subretusae ". The note on the elongated infructescences suggest that this may be *A. singarense*, but I have not seen specimens. The characters given in the key are taken from the following specimens of *A. condensatum* from Asia Minor : Ak-Dagh, *Aucher-Éloy* 266 (syn-type) ; Akher-Dagh, 6000 ft., July 1907, *Haradjian* 1592 ; between Marash and Zeytun, Jehan Keupri, 2500 ft., 9.5.1934, *E. K. Balls* 1003.

A. dasycarpum *Steph.*

Zohary (in Pal. Journ. Bot. J. ser., **2,** 162 : 1941) records this from " 18 km. W. of Suleimani [Sulaimaniya], 825 m., soft soil covered with gravel, 1933, *Eig and Zohary.*"

A. desertorum *Stapf* (*A. minimum* Willd. non L.).

6 km. above Ana, Duleim liwa, 130 m., edge of irrigated cornfield in dry steppe, yellow, 26.3.1947, *Gillett & Rawi* 6956.

In this specimen the longer filaments are tapering and without teeth or a truncate apex to the wing ; the shorter have two widely triangular teeth at or just below the middle. Boissier **1,** 281 (1867) describes the longer filaments as "ala abrupte truncata vel in dentem minutum abeunti"; Hegi (Ill. Fl. Mitteleur. **4,** I, 453, fig. 874 g : 1919) figures the longer filaments as bearing a tooth. In "Afghanistan: 1852, *Griffith* 1515 (1517) " the long stamens are attenuate and in " Phrygia : Ouchak, 23.5.1857, *Balansa* 1248 " long stamens with attenuate or truncate wings occur in the same flower. Handel-Mazetti p. 52 (1913) records this species from " In Wadis bei Kaijim unter Abakemal am Euphrat (Nr 660) " ; Pau y Vicioso (in Trab. Mus. Cienc. Nat. no. 14. p. 15 : 1918) cites a specimen from " El kadein (Eufrates) " which is presumably the same locality ; Zohary p. 70 (1950) has seen specimens from Kirkuk area.

A. homalocarpum (*F. et M.*) *Boiss.*

Shabicha, Southern desert, 200 m., subdesert, among rocks and on sandy stony slopes, frequent, yellow, 25.2.1947, *Gillett and Rawi* 6276.

Zohary (in Pal. Journ. Bot. J. ser., **2,** 162 : 1941) collected this about 400 km. west of Baghdad on gravel soil in the Syrian desert.

A. lanigerum *DC.* (*A. oxycarpum* Boiss. et Bal. var. *kurdicum* Boiss. Fl. Or. **1,** 269 : 1867).

In cacumine m. Gara Kurdistaniae, 27.7.1841, *Kotschy* 337 (Kew and B.M.).

Kotschy 337 is type material of *A. oxycarpum* var. *kurdicum* which was originally described as differing from *A. oxycarpum* in " Siliculae squamis lepidotis adspersae ". The plant is 15–26 cm. tall. In the typical *A. oxycarpum*, represented at Kew only by Balansa's syntype, the silicules are

glabrous and the plant only 5–8 cm. tall. On comparing var. *kurdicum* (*Kotschy* 337) with the material of *A. lanigerum* now available no constant differences can be seen, although *Kotschy* 337 shows no flowers.
Distr. N. 'Iraq, Pers.

A. linifolium *Steph.*

Ajuba, on the sandy hills, flowers white, Mar. 1918, *Graham* 25 ; Shaiba, Mesopotamia, 23.8.1929, *Watson* ; Qaiyara, Mosul, 640 ft., common except on very saline soil, especially where the soil has been disturbed by ants, etc., upright annual, leaves grey hairy, calyx reddish in colour, corolla pale yellow, young fruit reddish green glabrous erect, 10.2.1939, *Bayliss* 8 ; c. 5 km. west of Karbala, Karbala liwa, 80 m., subdesert, sandy gypsaceous, occasional, 9.3.1947, *Gillett & Rawi* 6375. Bornmüller p. 115 (1911) cites " In der Ebene, verbreitet, bei Kerkuk (28.IV.1893 ; no. 894) ".

Distr. Spain, Roumania, S. Russia, Orient, N. Afr., N. Asia (introduced in Australia).

A. menicoides *Boiss.*

Mesopotamia, *Aucher* 281 (B.M. isotype) ; Tuz, Apr. 1929, *Rogers* 0349 ; Kirkuk, Mar. 1930, *Rogers* 0704 ; 6 km. above Ana, Duleim liwa, 130 m., edge of irrigated cornfield in dry steppe yellow, 26.3.1947, *Gillet and Rawi* 6967 ; Salahaddin forestry enclosure, Arbil liwa, 1000 m., coppiced *Quercus aegilops* on limestone, yellow, 24.3.1948, *Gillet and Rawi* 10423 ; Gweija Dagh forestry enclosure, Sulaimaniya liwa, 1100 m., limestone mt. denuded of *Quercus* forest, yellow, 31.3.1948, *Gillet and Rawi* 10623.

Boissier **1,** p. 286 (1867) cites "In Mesopotamia (Auch. exs. 281!), ad Euphratem (Chesn. exs. 25 !) " ; both of which may or may not come from 'Iraq. Zohary (in Pal. Journ. Bot. ser. J., **4,** 235 : 1949) records this from Jabal Sinjar, Amadia, and the Arbil, Kirkuk, Sulaimaniya and Dohuk areas.

Sintenis 131 from Biredjik in Turkey is intermediate in style length and flower size between *A. menicoides* and *A. aureum* (Fenzl) Boiss.

A. mulleri *Boiss. et Buhse.*

Kodo near Haji Omran, Arbil liwa, 2800 m., mountainside, yellow, 22.6.1947, *Rawi* 9218.

In the flower dissected, two stamens had a small tooth near the base, the remaining four were attenuate and edentulate. Boissier **1,** p. 279 (1867) describes the filaments in this species as " omnibus a basi ad apicem sensim attenuatis ".

Distr. Cauc., Asia Minor.

A. singarense *Boiss. et Haussk.* (fig. 22).

" In cretaceis montis Sindjar inter Samucke et Zakinia ", March 1867, *Haussknecht* (type material) ; Arl Gird Dagh, 6000 ft., by a stream, 21.7.1932, *Guest* 2818 ; Jabal Khatchra near Balad Sinjar, 5.6.1934, *Field*

and Yussef Lazar 668 ; Gara Dagh, Mosul liwa, 1500–1700 m., near *Quercus libani*, yellow, 26.6.1947, *Rawi* 9263 ; Valley east of Arl Gird Dagh, Arbil liwa, 2100 m., *Astragalus* thorn-cushion zone on igneous or metamorphic rocks, yellow, 4.8.1947, *Gillett* 9502 ; Mergadreija near Haji Omran, Arbil liwa, 1800–1900 m., mountain side, yellow, 21.6.1947, *Rawi* 9145 ; Penjwin, Sulaimaniya liwa, 1600 m., 9.6.1948, *Rawi* 12223 ; Penjwin, 1700 m., mountain side, yellow, occasional, 9.6.1948, *Rawi* 12270 ; valley between Gunda Shor and Darband, Arbil liwa, c. 1400 m., steep stony open slopes in *Quercus libani–Q. infectoria* forest on igneous or metamorphic rock, yellow, occasional, 25.8.1948, *Gillett* 12402 ; Salahaddin, Arbil liwa, 4500 ft., loose light soil over limestone on edge of hot exposed S. scarp., low wiry herbaceous undershrub with deep taproot and yellow fls., 4.5.1951, *Mooney* 4326 ; Penjwin, 1550 m., stony mt. side, 20.8.1953, *Guest* 12971 ; Khalena, 1500 m., on the hill side, common, flowers yellow, 30.6.1954, *Rawi* 13795.

Gillett and Rawi's specimens are not a perfect match for Haussknecht's gathering which has a denser indumentum on all parts. The other characters however seem to agree reasonable well, although Haussknecht's specimen does not show a mature infructescence. The ripe silicules are elliptic, tapering at the base, obtuse at the apex, stellate hairy, 3–4·5 mm. long (excluding style), 1·5–2·5 mm. wide ; style 1–2 mm. long. *A. singarense* is represented from Persia by : " above Itisabiyeh, in Elburz, 6500 ft., open hillside, yellow, 28.6.1936, *Trott* 537 ".

Distr. N. 'Iraq, N. Pers.

A. strictum *Willd.*

Haji Omran (on Persian frontier), Arbil liwa, 6500 ft., 25.4.1951, *Mooney* 4261A ; Gara Dagh forest, above Sarsing, Mosul liwa, 4500 ft., a small herb with yellow flowers, *Mooney* 4309.

Nábělek p. 29 (1923) collected this at " distr. Serizor : Handrian Dar supra pagum Rewanduz dit. Erbil, alt. 1500–2000 m., 23.V.1910 (No. 1280a, 1297). Bornmüller p. 114 (1911) records it from Kuh-i-Sefin, above Schaqlawa (no. 890).

Mooney's specimens do not show silicules and the description of the fruit is taken from extra-Iraqian material. Plants of this species are often taller than in *A. szowitsianum* F. et M., but there is too much overlap in this character for it to be used in a key.

A. szowitsianum *F. et M.*

Mosul, fls. minute pale cream, *Graham* 787 ; Sefin Dagh above Shaqlawa, Arbil liwa, 1400 m., occasional, 9.5.1947, *Gillett* 8118 ; Gweija, Sulaimaniya liwa, 900 m., native name qau, 17.4.1947, *Rawi* 8549F ; Khantur, Mosul liwa, 1500 m., native name giakujik, 11.5.1947, *Rawi* 8552 ; Penjwin, Sulaimaniya liwa, 1400 m., 23.4.1947, *Rawi* 8839 ; Mergadreiza, near Haji Omran, Arbil liwa, 1800–1900 m., 21.6.1947, *Rawi* 9133 ; Bastura Chai, Arbil liwa, 600 m., conglomerate slopes, steppe-forest border, petals pale yellow, 27.3.1948, *Gillett and Rawi* 10508. *A. marginatum Steud.* (? immature) is recorded by Nábělek p. 29 (1923) from : " distr. Serizor : Kurruk-Dar prope pagum Rewanduz ad

septentr. ab urbe Erbil (Arbela). alt. ca. 1900 m., 22.v.1910 (No. 1278) ; Handrian-Dar prope Rewanduz, alt. 1800–1900 m., 23.v.1910 (No. 1280) ".

A. marginatum Steud. is rather doubtfully distinct from *A. szowitsianum*. Boissier p. 283 (1867) states that the latter species is distinguished by the longer fruiting raceme often an inch long, silicule not retuse with a style and marginate seed. *A. marginatum*, on the other hand, has a shorter inflorescence, an entire silicule, stigma subsessile and unwinged seed. Some specimens from the Orient at Kew appear to be more or less intermediate between the two species as defined by Boissier.

A. parviflorum *Fisch.* var. **hirsutum** (*M.B.*) *Koch* in Flora **24,** II, 463 (1841).

(*A. strigosum* Banks. et Sol., *A. hirsutum* M.B.).

Anthony p. 280 (1935) records this variety from Amara. Zohary (in Pal. Journ. Bot. ser. J, **4**, p. 235 : 1949) records this from Jabal Sinjar and the Rowanduz, Kirkuk, Sulaimaniya and Dohuk Areas.

There are notes on *A. parviflorum* A. Fisch. by Turrill in Kew Bull. 297 (1930) and in Journ. Bot. 261 (1935).

A. pseudocalycinum *Zohary* in Pal. Journ. Bot. J ser. **2,** 160 (1941) e descr.

The type material is " 46 miles N.W. of Kirkuk, near Smaller Zab River, gravel hills, 350 m., about 18 km. W. of Sulaimani[Sulaimaniya] gravel soil, 825 m. " ; both collected by A. Eig. and M. Zohary 1933. The species is described as differing from *A. xanthocarpum* Boiss. (*A. macrostylum* Boiss. et Huet) in the white lanceolate-cuneate deeply bilobed petals, orbicular silicule, style only 2–3 mm. long and the persistent calyx.

The following specimens are near *A. pseudocalycinum* :—

Bastura Chai, Arbil liwa, 600 m., conglomerate, steppe-forest border, corolla bright yellow, relatively large, 27.3.1948, *Gillett and Rawi* 10506 ; Haji Omran, Arbil liwa, 6500 ft., small herb with yellow fls., 25.4.1951, *Mooney* 4261.

These differ from the description of *A. pseudocalycinum* in the bright yellow petals (whitish when dried), and the style 1–1·5 mm. long. The leaves are smaller and the petioles shorter, but this may only be due to the lesser luxuriance of the individual plant and not a constant character. The silicules are not quite mature but appear wide elliptic rather than orbicular. As both these gatherings only show immature fruit, they are not described as new.

Alyssum sp.

" Pl. Mesopot., Kurdistan and Mossul," *Kotschy* 173.

This is near *A. lanigerum*, but in the absence of fruits is not identified more accurately. The specimen is doubtfully from 'Iraq.

Anchonium elichrysifolium (*DC.*) *Boiss.* var. **tournefortii** (*Boiss.*) *Bornm.* in Beih. Bot. Centrabl. **28,** abt. 2, 109 (1911). (fig. 43).

Riwandous (ad fines Pers.) in m. Sakri-Sakran regione alpina, 2200 m., 23.6.1893, *Bornmüller* 880.

This variety is described by Bornmüller as " minor, caulibus subsimplicibus, non vel vix ramosis, inferne tantum oligophyllis vel nudis ". The Persian form, which he takes as typical, has a branched and leafy stem. All the 'Iraq material so far seen, including that in the Rustam Herbarium and Gillett and Rawi's gatherings, belong to the variety *tournefortii*.

Arabidopsis pumila (*Steph.*) *Busch.* (*Sisymbrium pumilum* (Steph.) Busch.)

Zankura, in the barley fields, flowers yellow, 3.3.1918, *Graham* 21 (B.M.) ; Abughreib, Baghdad liwa, 40 m., irrigated alluvium, weed among cereal, common, yellow, 13.3.1948, *Gillett* 10198 ; Daltawa, Diyala liwa, 70 m., date gardens, occasional, yellow, 18.3.1948, *Gillet and Rawi* 10222 ; Acra, Mosul liwa, 31.5.1948, *Rawi* 11452 ; Basra, in phoenicitis [date groves], flor. flavis [fls. yellow], 23.3.1893, *Bornmüller* 52.

Pau & Vicioso (in Trab. Mus. Nat. Cienc. Nat. no. 14 p. 14 : 1918) record this from " Haditsé y el Kadim (Eúfrates) ".

Arabis *L.*

A. Flowers 10–15 mm. long ; calyx bisaccate ; prostrate perennial herb with sterile rosettes of leaves . . . . . *A. caucasica* Willd.

A.[1] Flowers 2–7 mm. long ; sepals subequal ; erect herb, basal rosette on flowering stem only

B. Peduncles as wide as siliquas or nearly so, up to 3 (rarely 5) mm. long and 1 mm. wide ; siliquas erect-spreading or spreading ; annual

C. Stem-leaves rounded or semi-amplexicaul at base ; flowers 4–7 mm. long . . . . . *A. aucheri* Boiss.

C.[1] Stem leaves amplexicaul sagittate at base ; flowers 3–6 mm. long *A. auriculata* Lam.

B.[1] Peduncles thinner than siliqua, 4–8 mm. long, under 0·5 mm. wide ; flowers 4–8 mm. long ; siliquas adpressed ; perennial generally taller . . . . . *A. hirsuta* (L.) Scop.

Arabis aucheri *Boiss.*

Bastura Chai, Arbil liwa, 600 m., shallow soil over conglomerates, steppe-forest border, corolla white, fruit puberulent, occasional, 27.3. 1948, *Gillett* 10502 ; do., fruit glabrous, frequent, *Gillett & Rawi* 10505 ; Gweija Dagh forestry enclosure, Sulaimaniya liwa, 1100 m., limestone, *Quercus* forest destroyed, yellow (?), 10502, 10503, 10505 are represented here also, 31.3.1948, *Gillett & Rawi* 10622.

A. auriculata *Lam.*

Pir Omar Gudrun above Qarachitan, Sulaimaniya liwa, 1330 m., limestone, *Quercus aegilops* forest coppiced, in shade of rock, white, 19.4.

1947, *Gillett* 7779 ; Bastura Chai, Arbil liwa, 600 m., conglomerate slopes, shallow soil, steppe-*Quercus* forest border, petals white, fruit glabrous, stem with short stellate hairs only without the long unbranched hairs of nos. 10505 and 10502, all grow together and seem to be forms of one species, frequent, 27.3.1948, *Gillett & Rawi* 10503 ; Salahaddin forestry enclosure, Arbil liwa, 900 m., limestone mt., coppiced *Quercus aegilops* forest, N. aspect, white, 18.4.1948, *E. Chapman* 11971.

Bornmüller p. 104 (1911) cites a specimen at Kew from " Berge östlich von Erbil [Arbil], felsige Abhänge des Kuh-i-Sefin, 1500 m. (11.V.1893 ; no. 857) " as *A. montbretiana* Boiss. This species seems very doubtfully distinct. It should be noted that the characters given above to separate *A. aucheri* and *A. auriculata* are ones which are known to vary within the single species *A. hirsuta* as usually understood in N.W. Europe. These two species are left until the other Oriental species in this group can be revised as well.

A. hirsuta (*L.*) *Scop* (*A. sagittata* DC.).

Kurdish hills, 2000 ft., found growing by a stream, 4.4.1936, *Mrs. A. Low* 158 (B.M).

Distr. N. Temp. Hemisphere.

Aubrieta parviflora *Boiss.* (*A. kotschyi* Boiss.). (fig. 16).

In rupr. m. Sinjara, 1867, *Haussknecht* ; in Montis Kuh-Sefin (ditionis Erbil), 1100–1500 m., 12.5.1893, *Bornmüller* 883 ; Rowanduz Gorge, under and on damp rocks, 2000–2500 ft., flowers pale pink, 19.4.1936, *Mrs. A. Low* 189, 191 (B.M.) ; Pir Omar Gudrun above Qarachitan, Sulaimaniya liwa, 1000 m., crannies in limestone rocks, *Quercus aegilops* forest formation, frequent, lilac, 19.4.1947, *Gillett* 7749 ; Sefin Dagh above Shaqlawa, Arbil liwa, 1100–1400 m., same habitat as 7749, N. aspects, pale lilac, occasional, 9.5.1947, *Gillett* 8161 ; Jabal Sinjar above Kursi, Mosul liwa, 1050 m., limestone crag, N. aspect, petals white, 24.5.1948, *Gillett* 11043 ; Haji Omran, Arbil liwa, 1750 m., petals lilac, 3.6.1948, *G. & E. Chapman* 11931 ; Zewiya, Pir Omar Gudrun, Sulaimaniya liwa, 1100–11500 m., native name bonkhoshka, 6.6.1948, *Rawi* 11529 ; Jabal Avroman, Darimar village, Sulaimaniya liwa, 1150 m., limestone crags in *Quercus aegilops* formation, common, 8.6.1948, *Gillett* 11832.

Boissier p. 1 (253) uses the characters of the truncate or attenuate apex to the wing of the longer filaments to separate *A. parviflora* and *A. kotschyi*. As both types of filament may be found in the same gathering (e.g. *Gillett* 7749 and Persia : *Trott* 1017) the two species are here merged into one.

Boissier (l.c.) describes a var. *kurdica* (type material not seen) and Bornmüller p. 112 (1911) a var. *brachycarpa* (*Bornmüller* 883 syntype at Kew). As there is considerable variation within the species in the size of the plant and in the relative lengths of style and fruit-valve, and the correlation between the characters is rather uncertain these varieties are here not kept separate.

Distr. Asia Minor, N. 'Iraq, Pers.

Barbarea *R. Br.*

A. Biennial ; plants 18–75 cm. high

B. Lower leaves lyrate 2 4 pairs of pinnae, terminal segment subcordate-rotundate . . . . . *B. arcuata* Rchb.

B.[1] Lower leaves sublyrate lateral lobes little more than teeth, terminal segment oblong (fig. 40) . . . . . *B. plantaginea* DC.

A.[1] Perennial ; plants 6–24 cm. high ; radical leaves small ovate-oblong without any pinnae . . . . . *B. minor* C. Koch

This key is founded on Boissier's treatment of the species.

Barbarea arcuata *Rchb.*

Riwandus [Rowanduz] (Kurdistan) in m. Sakri-Sakran regione alpina, 2000 m., 23.6.1893, *Bornmüller* 861 ; Qara Dagh, Sulaimaniya liwa, c. 1400 m., limestone mountain with well developed *Quercus* forest, dampish spots, frequent, bright yellow, 23.4.1947, *Gillett* 7923.

B. minor *C. Koch.*

Bornmüller p. 105 (1911) cites " Riwanduz (Kurdistan) in der alpinen Region des Helgurd, 2700 m. (26.VI.1893 ; no. 864) ". Kurdish hills, 5000–6000 ft., found in wet meadows and beside a spring, 21.4.1936, *Mrs. A. Low* 217 (B.M.).

Biscutella ciliata *DC.* var. **applanata** *Mach.-Laur.* (*B. columnae* Boiss. non *Ten.*) (fig. 25).

Bornmüller p. 118 (1911) cites " Assyrien (Kurdistan) : Kuh-i-Sefin, 1000 m. (9.V.1893 ; no. 903) " as *B. columnae* Ten. Anthony p. 281 (1935) lists this species from Mosul, Kizil Robat and Baghdad. Bornmüller's specimen is at Kew and so is *Graham* 669, which is probably the same species as Anthony's *B. columnae* Ten. Both these gatherings are *B. ciliata* var. *applanata* according to Machatscki-Laurich's revision of the genus (Bot. Archiv. **13,** 1–110 (1926)).

Brassica *L.*

A. Siliqua 1·5–10 cm. long ; beak markedly conical, sometimes as wide as siliqua

B. Stem-leaves amplexicaul

C. Open flowers not exceeding the flower buds

[D. Calyx closed ; petals pale yellow and white 18–25 mm. long ; anthers 2·5–4·5 mm. long, attenuate ; margins of siliqua undulate ; leaves ± fleshy, stem-leaves generally little amplexicaul . . . . . *B. oleracea* L.]

D.[1] Calyx half-open ; petals bright yellow, rarely pale yellow, 7·5–18 mm. long ; anthers 1·5–3 mm. long, somewhat obtuse ; margins of siliquas straight ; leaves membranous, stem-leaves very amplexicaul . . . . . *B. napus* L.

C.[1] Open flowers exceeding the flower buds ; leaves membranous, stem-leaves deeply amplexicaul . . . . . *B. campestris* L.

B.[1] Stem leaves not amplexicaul

E. Siliquas very stipitate (1·5–4 mm.) at base ; siliquas erect-spreading . . . . . *B. elongata* Ehrh.

E.[1] Siliquas sessile or very shortly stipitate (up to 1·2 mm.) at base

F. Petals obovate 6·5–12 mm. long, sepals 3·5–6 mm. long ; lower stem leaves ± the same size as radical leaves or basal rosette often absent

G. Sepals glabrous or with scattered hairs ; siliquas erect-spreading . . . . . *B. juncea* (L.) Czern. et Coss.

G.[1] Sepals ± villose with crisped hairs ; siliquas ± deflexed *B. deflexa* Boiss.

F.[1] Petals narrow oblong-obovate 5–7 mm. long ; sepals 3 mm. long ; stem subscapiform, stem-leaves much smaller than well-developed basal rosette . . . . . *B. tournefortii* Gouan

A.[1] Siliquas small 1–2 cm. long, adpressed ; beak of siliqua very thin always seedless (fig. 32) ; stem-leaves not amplexicaul *B. nigra* (L.) Koch

The key above is slightly modified from that given in Schulz's *Brassiceae*.

Brassica campestris *L.* var. **rapa** (*L.*) *Hartm.*

Anthony p. 280 (1935) records this from Mirzani and Baghdad as *B. rapa* L.

B. deflexa *Boiss.*

Shargat, Arbil, 1920, *Thomas* (comm. *Graham*) ; Zubair, Basra liwa, 20 m., weed among wheat in depressions in subdesert, yellow, 12.2.1947, *Gillett and Rawi* 6038 ; Tarmiya, Baghdad, dry side of irrigation canal, very abundant, 2.5.1955, *Haines* W118.

6038 shows no fruit and can only be identified doubtfully.

Distr. Syria, 'Iraq, Persia, Arabia, Afghan., Baluch.

B. deflexa *Boiss.* var. **lasiocalycina** (*Boiss. et Haussk.*) *O. E. Schulz* in Pflanzenfam. **70,** IV, 105, p. 64 : 1919. (fig. 48).

In gramin. Singarae, May 1867, *Haussknecht.*

This specimen does not show the lower leaves.

Schulz describes this variety as differing from the typical in leaf shape and wider siliquas as thus :—lower leaves lyrate or sinuate-pinnatifid, terminal lobe ovate, lateral lobes 3 on both sides decreasing in size, all unequally dentate ; lower pedicels up to 1·2 cm. long ; siliquas up to 6·8 cm., 2–2·5 mm. wide, beak only 3–4 mm. long subinflated very obtuse (always ?). Seeds typical.

Distr. (of var.) Syria, 'Iraq.

B. near **deflexa** *Boiss.*

Tarmiya, Baghdad, dry side of irrigation canal, abundant, 2.5.55, *Haines* W119. This specimen has the peduncles and siliquas slightly erect-spreading or almost at right-angles to the inflorescence-axis but otherwise resembles *B. deflexa.*

B. elongata *Ehrhart* ?

Baghdad, *Colvill* 103.

Only known from 'Iraq from this one poor specimen. In material from other countries at Kew the leaves are thicker, more bluntly toothed and more often simple (pinnatifid at most) than in *B. juncea* and *B. deflexa.*

Distr. S.E. Eur., Cauc., As. Min., N. Persia, Transcaspia, (introduced in Britain).

B. juncea (*L.*) *Czern. et Coss.* (*Sinapis juncea* L.).

Anthony p. 281 (1935) cites a specimen from Amara as *Sinapis juncea* L.

B. napus *L.*

Anthony p. 280 (1935) records this from Amara.

B. nigra (*L.*) *Koch.* (fig. 32).

Ad Tigrim, *Aucher-Eloy* 226 ; Karada. cotton farm, in cult. fields, 21.1.20, *Paranjypye* (comm. *Graham*) ; loc. ?, c. 1935 *anon.* BAG 5455.

Nábělek p. 33 (1923) cites a specimen from near Mosul on the banks of the Tigris (no. 1385).

[**B. oleracea** *L.* s.l.

Karbala, Karbala liwa, 30 m., in shaded vegetable garden, pale yellow, said to be a bolted cauliflower growing with the typical form, 8.3.1947, *Gillett and Rawi* 6341.]

B. tournefortii *Gouan.*

Zankura, weed in barley fields, native name lijail, flowers medium pink white, 3.3.1918, *Graham* 18 (B.M.) ; Ramadi, in garden land not common, fls. medium white, Mar. 1918, *Graham* 29 (B.M.) ; Shargat, hillock sides Shargat Camp, not too common, 7.3.1919, *Calder* 1970 (B.M.) ; Najan, c. 10 km. S. of Zubair, Basra liwa, 20 m., sandy gravelly subdesert, in patches of irrigated wheat-*Tamarix articulata* cultivation, pale yellow, frequent, 13.2.1947, *Gillett & Rawi* 6071 ; S. bank of Euphrates opposite Rawa, Duleim liwa, 140 m., limestone crags, dry steppe formation, pale yellow, frequent, 28.3.1947, *Gillett & Rawi* 7059 ; Fata, Jabal Hamrin, about 400 ft., in a sheltered corner in a hollow, food plant of *Euchloe belia*, about 3 ft. high, 30.3.1920, *H. D. Peile.*

The plant is more scapiform than the other Oriental species of *Brassica*, and the flowers smaller. The siliquas are erect-spreading to slightly deflexed 3·5–6·5 cm. long.

Brossardia papyracea *Boiss.* (figs. 46 and 47).

Pir Omar Gudrun, June 1867, *Haussknecht* (Kew and B.M.) ; in montis Kuh-Sefin (ditionis Erbil) regione superiore, 1600 m., 21.5.1893, *Bornmüller* 902 ; Pir Omar Gudrun above Qarachitan, Sulaimaniya liwa, 1400–1600 m., limestone mountain coppiced *Quercus aegilops* forest, purple, frequent, 19.4.1947, *Gillett* 7787 ; Penjwin, Sulaimaniya liwa, 1400 m., pink, rare, native name chayata, 24.4.1947, *Rawi* 8807 ; Sefin Dagh above Shaqlawa, Arbil liwa, over 1300 m., limestone mountain, *Quercus* forest, purple, common, 9.5.1947, *Gillett* 8148 ; Jabal Avroman above Darimar, Sulaimaniya liwa, 2000 m., limestone *Astragalus–Amygdalus—Umbelliferae* community, occasional, 8.6.1948, *Gillett* 11851 ; Penjwin, Sulaimaniya liwa, 1700 m., common, 9.6.1948, *Rawi* 12261.

To judge from the material of *Kotschy* 327. 523 and *Haussknecht's* specimen from Pir Omar Gudrun, both cited by Boissier as *B. retusa* Boiss., *B. retusa* is not a distinct species.

Bunias orientalis *L.*

Zohary (in Pal. Journ. Bot. ser. J., **4,** 235 : 1949) lists this from the Dohuk district.

Cakile arabica *Bornm. et Vel.* (det. B. L. Burtt et P. Lewis).

" Jebel Samara " [Jabal Sanam ?], 23.8.1919, *Watson.*

Petals mauve or purple, 6–12 mm. long ; fruit 14–18 mm. long.

Distr. Central Arabia, S. 'Iraq.

[**Camelina hispida** *Boiss.* (fig. 10).

Euphrates Expedt., *Chesney* 142, 161.

Possibly from Turkey or Syria rather than 'Iraq.].

Cardamine *L.*

A. Annual, petals c. 2 mm. long . . . . . *C. hirsuta* L.

A.[1] Perennial, petals 6–10 mm. long ; generally larger in all parts *C. uliginosa* MB.

Cardaria *Desv.*

A. Base of fruit cordate . . . . . *C. draba* (L.) Desv.

A.[1] Base of fruit rounded to wide cuneate (fig. 19) *C. chalepense* (L.) Hand.-Mazz.

Cardaria chalepense (*L.*) *Hand.-Mazz.* (*Lepidium chalepense* L.). (fig. 19).

Jabal Avroman above Darimar, Sulaimaniya liwa, 2100 m., limestone, *Astragalus*, *Amygdalus*, *Umbelliferae* community above limit of oaks, white, occasional, 8.6.1948, *Gillett* 11858 ; Penjwin valley, Sulaimaniya liwa, 1400 m., 8.6.1948, *Rawi* 12145.

The material under *Lepidium draba* L. in the Rustam Herbarium should be separated from that genus as *Cardaria draba* (L.) Desv. Schulz reduces *C. chalepense* to a subspecies of *C. draba.*

[**Cheiranthis cheiri** *L.*

Cult. in Mandi gardens, Baghdad, 5.4.1920, *Graham* ; Rustam, in gardens, Apr. 1930, *Guest* 239.].

Chorispora *DC.*

A. Flowers smaller, calyx 5–6 mm. long . . . *C. tenella* (Pall.) DC.

A.[1] Flowers larger, calyx 7–10 mm. long (fig. 60).
C. purpurascens (Banks et Sol) Eig.

Chorispora tenella (*Pall.*) *DC.*

Anthony p. 282 (1935) records this from Jabal Hamrin.

[**Chrysochamela velutina** (*DC.*) *Boiss.* (*Cochlearia velutina* DC., *Hutchinsia chrysantha* Jaub. et Spach.) (fig. 14).

Boissier **1,** p. 313 (1867) cites " In Assyria (Oliv.) ", but this may be from Syria or Turkey].

Clastopus vestitus (*Desv.*) *Boiss.* var. **eriocarpus** *Blakelock*, var. nov. (fig. 11). A typo siliculo dense breviter stellato-tomentosa differt.

Haji Omran, Arbil liwa, 1800–2000 m., slates of Nappe zone, S. aspect *Astragalus* thorn-cushion formation, yellow, *G. and E. Chapman* 11192 ; Penjwin, Sulaimaniya liwa, 1800 m., mountainside, common, native name margila, 9.6.1948, *Rawi* 12242 (type of variety).

Rawi 12242 shows accrescent and persistent calyces up to 10–12 mm. long. The silicules are 6–7 mm. long and 4–5 mm. wide. The long style (5 mm. long) falls off the fruit leaving an apiculus c. 1 mm. long. The accrescent calyx distinguishes our plant from *S. erubescens* Haussk., if the latter is maintained as a distinct species and not merely a variety of *C. vestitus*. There is a monograph of this genus and the closely related genus *Strausiella* by Bornmüller in Fedde Repert. **3,** 114–116 (1907). *Distr.* (of species). N. Pers.

Clypeola *L.*

A. Silicules with a membranous wing, with straight hairs or glabrous
C. jonthlaspi L.

A.[1] Silicules without a membranous wing, with rigid retrorse barbellate bristles

B. Petals 2·5 mm. long ; style 0·5 mm. long ; fruiting pedicels arcuate-recurved . . . . . *C. aspera* (Grauer) Turrill

B.[1] Petals 3·75–4 mm. long ; style c. 1·5 mm. long ; fruiting pedicels abruptly recurved (fig. 33) . . . . . *C. lappacea* Boiss.

This key is from Chaytor and Turrill in Kew Bull. 1–24 (1935), where the details of intraspecific variation are also given.

Clypeola aspera (*Grauer*) *Turrill* (*C. lasiocarpa* Juss. ex Pers., *C. echinata* DC., *C. chaetocarpa* Jaub. et Spach).

Nr. Chemchemal, 2500 ft., 6.4.1929, *Rogers* 0179A ; in desertis ad Kerkuk, c. 400 m., 26.4.1893, *Bornmüller* 898 ; Eski Kellet, Mosul liwa, 230 m., moist steppe, shallow stony slopes (conglomerate), white, 23.3. 1948, *Gillett and Rawi* 10374.

Clypeola lappacea *Boiss.* (fig. 33).

Sulaimaniya, dwarf plant pubescent with small yellow flowers, common, Apr. 1920, *Graham* 744 ; do., cream flowers, growing on rocks, Apr. 1920, *Graham* 753 ; do., small yellow flowers, Apr. 1920, *Graham* 767 ; Sulaimaniya, 1000–3000 ft., in good soil on hillside, 1.4.1936, *Mrs. A. Low* 138 (B.M.) ; Salahaddin forestry enclosure, Arbil liwa, 1050 m., coppiced *Quercus* forest on limestone, yellow, abundant, *Chapman* 11968.

Guest 715, 1276, 1266, which I previously identified as near *Alyssum fulvescens* and *A. macrostylum*, are this species.

Coluteocarpus vesicaria (*L.*) *Holmb.* (*C. reticulatus* Boiss.) var. **boissieri** *Hausskn.* ex Bornm. in Beih. Bot. Centrabl. **19,** 207 (1906). (fig. 52).

Matina, native name paqpaquschka, 1500 m., 15.4.1947, *Rawi* 8747. Bornmüller p. 117 (1911), also records this from Helgurd [Arl Gird Dagh], 3000 m. (no. 895). This variety was originally described from Persian material as " foliis spathulatis multo latioribus ac in type facile distinguenda ". In the typical plant, from Asia Minor and Syria, the leaves are linear to oblong-linear, but there are intermediates between this and the variety (e.g. Kurdistan, *Olguin* ; Erzerum, *Zorab*).

Conringia *Adans.*

A. Beak of siliqua attenuate at apex . . . . . *C. persica* Boiss.

A.[1] Beak of siliqua clavate-incrassate at apex (fig. 53) . *C. clavata* Boiss.

Conringia persica *Boiss.*

Zohary (in Pal. Journ. Bot. J. ser. **4,** 235 : 1949) records this from the Sulaimaniya area.

Coronopus squamatus (*Forsk.*) *Asch.*

Mandali, 10.5.1930, *Guest* 884 ; Badra, Kut liwa, 100 m., path among date gardens, white, 18.3.1947, *Gillett* 6602.

Crambe *L.*

A. Lower portion of silicule 0·75–1 mm. long ; upper portion 2·5–3·5 rarely 4·5 mm. diam. . . . . *C. orientalis* L.

A.[1] Lower portion of silicule 1·5 to almost 2 mm. long ; upper 4 mm. diam. . . . . *C. alutacea* Hand.-Mazz.

Crambe alutacea *Hand.-Mazz.* e descr.

Handel-Mazzetti p. 54 (1913) records this from " Schios nördlich von Mossul gegen Peschchawur " [=Faish Khabur ?]. He also records

the species from the adjacent parts of Asia Minor and Syria. The upper portion of the silicule is described as exactly globose, very obtuse, 4 mm. in diameter, " pericarpio tenui durissimo corii more eleganter alutaceo et indistincte longitudinaliter exarato ". From the description it is difficult to see any very marked differences between this and *C. orientalis*, although *C. alutacea* is described as biennial (or monocarpic perennial ?) while *C. orientalis* is stated to be perennial.

The characters given in the key above are from Schulz's *Brassiceae* p. 229.

Crambe orientalis *L.* (fig. 2).

Mahmour Dagh, Arbil liwa, 700 m., moist type steppe with *Pistacia*, steep limestone slopes, yellow, fruit globular, occasional, 30.5.1948, *Gillett* 11230 ; in deserto Singara, May 1867, *Haussknecht.*

Gillett 11230 shows a densely hairy stem ; *Haussknecht's* specimen is glabrous. Boissier's description p. 407 (1867) states " caule glabro ", but the stem in " Plaine de Césarée (Cappadoce) *Balansa* 1001 ", cited by Boissier as *C. orientalis*, is hispid. Schulz (Brassiceae pp. 238-239) recognizes several varieties on the degree of hairiness as well as other characters. *Gillett*'s plant is presumably var. *sulfurea* Stapf ex O. E. Schulz l.c. described as " petala sulfurea ".

Descurainia sophia (*L.*) *Webb.* (*Sisymbrium sophia* L.).

6 km. above Rawa, Duleim liwa, 150 m., dry steppe irrigated fields by river, only one seen, yellow, 27.3.1947, *Gillett and Rawi* 7026 ; Haji Omran, Arbil liwa, 1750 m., *Astragalus* thorn cushion zone with cultivation yellow, 3.6.1948, *G. Chapman* 12277.

Diplotaxis *DC.*

A. Leaves coarsely dentate ; other characters various

B. Petals lilac ; siliquas erect with beak 1–2 mm. long *D. acris* (Forsk.) Boiss.

B.[1] Petals yellow; siliquas pendulous with short beak up to 1 mm. long *D. harra* (Forsk.) Boiss.

A.[1] Leaves generally ± pinnatifid to pinnatisect with large terminal lobe ; petals white with purple claw ; siliquas erect or spreading with long beak 2–3 mm. long . . . . . *D. erucoides* (L.) DC.

Diplotaxis acris (*Forsk.*) *Boiss.* (fig. 49).

5 km. east of As Salman, Southern desert, 2000 m., subdesert, among stones in wadis, etc. occasional, lilac, 24.2.1947, *Gillett and Rawi* 6215 ; Shabicha, Southern desert, 200 m., sandy gypsaceous hills and wadi beds, leaves edible by people, frequent, native name yahaq, 25.2.1947, *Gillett and Rawi* 6291.

This species is well figured by Haines in Bull. Inst. Fouad Ier du Désert **1,** 104, f. 1 : 1951.

Drabopsis verna *C. Koch.* ((*Drabopsis nuda* (Bélanger) Stapf ; *Sisymbrium nudum* (Bélang.) Boiss.).

Haji Omran, 6800 ft., minute herb about 1 inch high with radical leaves, fls. yellow, 24.4.1951, *Mooney* 4280 ; Gweija Dagh forestry enclosure, Sulaimaniya liwa, 1100 m., limestone mt., *Quercus* forest destroyed, 31.3.1948, *Gillett & Rawi* 10635.

Eremobium aegyptiacum (*Spreng.*) *Hochr.* (fig. 27).

20 km. West of Samawwa, Diwaniya liwa, 20 m., sandhills, subdesert, mauve, 21.2.1947, *Gillett and Rawi* 6123.

There is a note on this species by Burtt and Lewis in Kew Bull. 287 : 1949.

Erophila verna (*L.*) *Chevall.* sensu lato.

A. Leaves covered above with minute thin bifurcate and stellate hairs ; seeds 0·3–0·4 mm. long ; ovary 44–60-ovulate ; silicules oblanceolate . . . . . *E. verna* (L.) Chevall.

A.[1] Leaves covered above with fairly large and fairly thick hairs many simple mixed with some ± bifurcate hairs ; seeds 0·5 mm. long : ovary 24–40 ovulate

B. Silicules shortly obovoid . . . . . *E. praecox* (Steven) DC.

B.[1] Silicules narrowly ellipsoid or oblong-linear *E. setulosa* Boiss. et Bal.

Zohary (in Pal. Journ. Bot. ser. J., 235 : 1949) records this *E. setulosa* Boiss. et Bal. from Amadia and the Rowanduz area. He also records *E. praecox* (Steven) DC. According to Schulz (in Pflanzenfam. p. 521) the three species found in 'Iraq differ as shown in the key above, but it is doubtful how far they are " good " species.

A study of the N.W. European *E. verna* s.l. has been made by Winge (in Comp. Rend. Trav. Lab. Carls. **23,** no. 3, 41–73 : 1940), who divides *E. verna* into four oecospecies with different chromosome numbers, but the application of this division to Oriental material is very doubtful. For the present all the 'Iraq material is named as *E. verna* s.l.

Eruca sativa *Mill.* var. **eriocarpa** (*Boiss.*) *Post* Flor. Syr. Pal. Sin. 79 (1896).

This variety differs from the typical in having the valves of the siliqua covered by retrorse hairs.

Erucaria *Gaertn.* and **Reboudia** *Coss. et Dur.*

A. Siliqua ± straight ; upper portion much constricted between seeds, deeply striate when mature, apex rounded compressed ; 1–2 seeds in upper portion ; style filiform

B. Petals 4–7 mm. long ; siliquas adpressed or spreading 6–9 mm. long *Reboudia pinnata* (Viv.) O. E. Schulz

B.[1] Petals 8–14 (rarely 7) mm. long ; siliquas adpressed, 12–15 mm. long ; generally a larger plant . . . *E. hispanica* (L.) Druce

A.[1] Mature siliqua often recurved ; upper portion little or much constricted between seeds, striate, apex conic ; 2–6 seeds in upper portion ; style conic

C. Mature siliqua scarcely constricted between seeds, shallowly striate

D. Plant glabrous, glabrescent or sparsely hairy, leaf-segments 1–3 mm. wide

E. Mature siliqua acute at apex . *E. crassifolia* (Del.) Forsk.

[E.[1] Mature siliqua long attenuate at apex . *E. uncata* Boiss.]

D[1] Plant ± hairy ; leaf-segments up to 1 mm. wide *E. bornmülleri* O. E. Schulz

C.[1] Mature siliqua upper portion much constricted between seeds deeply striate ; leaf segments up to 1 (rarely 1·5) mm. wide *E. cakiloidea* (DC.) O. E. Schulz

Erucaria crassifolia (*Forsk.*) *Del.*

Escarpment east of Wadi el Ubeigidh, Karbala liwa, 100 m., subdesert, gypsaceous sand hills, purple, 9.3.1947, *Gillett and Rawi* 6414.

Anthony p. 282 (1935) records this from Ruz, Ramadi and Jabal Sanam.

E. hispanica (*L.*) *Druce* (*E. aleppica* Gaertn., *E. boveana* Coss., *E. linearifloba* Boiss., *E. myagroides* (L.) Hal.)

There is a discussion of the synonymy and variation in the cotyledons by Burtt and Lewis (in Kew Bull. 288 9 : 1949). *E. boveana* Coss. var *alata* Zohary in Pal. Journ. Bot. J ser., **2,** 163 (1941) is described as " articulus superior inferiori aequilongus vel brevior, alatus vel late dentatus ; siliqua glabra ± erecta " ; it was collected in " Basra distr. : 13 km. E. of Ali Gharbi, 1933, *Eig and Zohary.*"

[**E. uncata** *Boiss.* (*Hussonia uncata* Boiss.).

This is rather a doubtful species in 'Iraq. Anthony (in Notes R. Bot. Gard. Edinb. **18,** 282 : 1935) records " *Erucaria uncata* Asch. et Schwein." from Falluja and Amara. *E. uncata* Asch. et Schwein. is given by O. E. Schulz (p. 14) as a synonym of *E. crassifolia* (Forssk.) Del var. *tourneuxii* (Coss.) O. E. Schulz. The specimen cited by Boissier (Fl. Or. Suppl. 63) i.e. " In Mesopotamiae deserto ad fluv. Chabur et montem Sindjar *Haussknecht* " is identified by Schulz (p. 18) as *E. bornmuelleri* O. E. Schulz. *E. uncata* Boiss. is, however, maintained as a species (p. 15) and specimens are cited from Arabia, Sinai and Egypt].

Erysimum *L.*

A. Annuals

B. Siliquas subterete, slightly compressed laterally, subpatent, up to 22 mm. long ; peduncle 1 mm. long or less ; fls. subsessile ; petals yellow 3–6 mm. long ; hairs 2-fid . . *E. sisymbrioides* C.A.M.

B.[1] Siliquas tetragonous ; petals 6 or more mm. long ; other characters various

C. Hairs 2- and 3-fid ; petals yellow 6–7 (rarely 9) mm. long ; siliquas torulose spreading up to 75 mm. long c. 1 mm. wide, style as wide as siliqua . . . . . *E. repandum* L.

C.[1] Hairs all 2-fid ; petals 10–12 mm. long ; other characters various or unknown

D. Plants grey ; stem simple ; fls. pedicellate ; petals yellow 10 mm. long, apex of siliqua retuse . . *E. tenuissimum* J. Gay

D.[1] Plants green ; stem branched ; fls. subsessile ; petals (colour unknown) 12 mm. long ; style thinner than siliqua, stigma bilobed . . . . . *E. tenellum* DC.

A.[1] Biennials or perennials

E. Siliquas dorsally compressed (the replum lies in the widest diam.) ; petals yellow

F. Hairs all bifid

G. Leaves entire, basal rosette present at fl. time ; siliquas erect, not tapering, 6·9–9 cm. long, 0·15–0·25 cm. wide *E. thyrsoideum* Boiss.

G.[1] Leaves coarsely toothed, basal leaves withered at fl. time, siliquas spreading, tapering sometimes sinuous, 3–9 cm. long, 0·3–0·4 cm. wide, valves bisulcate (fig. 44) *E. gladiiferum* Boiss. et Haussk.

F.[1] Hairs 3–4-fid as well as bifid

H. Leaves oblong-spathulate or linear-spathulate ; siliquas (including style) up to 20 mm. long, 2 mm. wide *E. nasturtioides* Boiss. et Haussk.

H.[1] Leaves linear-setaceous to linear-spathulate ; siliquas 38–50 cm. long, 1 mm. wide . . . . *E. aciphyllum* Boiss.

E.[1] Siliquas ± terete ; hairs all 2-fid ; petals yellow, purple or white

I. Siliquas contorted up to 10 mm. long; petals white *E. strophades* Boiss.

I.[1] Siliquas longer straight ; petals yellow or purple

J. Siliquas up to 30 mm. long; petals purple . *E. oleifolium* J. Gay

[J.[1] Siliquas 38–50 mm. long ; petals yellow *E. filifolium* Boiss. et Haussk.]

E.[2] Siliquas tetragonous ; hairs 3–4-fid as well as bifid ; petals yellow

K. At least upper leaves dentate

L. Plant 24–50 cm. tall, stem-leaves over 4 cm. long *E. gayanum* Boiss.

[L.[1] Plant generally shorter, lengthening much in fruit, caespitose, stem-leaves under 4 cm. long . *E. pulchellum* (Willd.) Boiss.]

[K.[1] Leaves entire . . . . . *E. kurdicum* Boiss. et Haussk.]

A critical genus in which some species are only represented at Kew by imperfect material. The key given above is modified from that of Boissier (**1,** 186–8 : 1867). In the original the key is not entirely satisfactory ; firstly because Boissier uses the distinction between biennial and perennial for a major division of his key, this character is difficult to observe except in plants in cultivation and in any case is probably not always a valid specific distinction ; secondly specimens are often collected showing flowers and only young fruit. At this stage the shape of the siliqua in transverse section is not very clearly shown although it is generally possible to say whether the siliquas are strict or spreading.

An artificial key is therefore given below :—

A. Leaves entire, petals various

B. Petals purple, siliquas and peduncles subpatent or spreading
E. oleifolium J. Gay

B.¹ Petals white, siliquas contorted, peduncles strict . *E. strophades* Boiss.

B.² Petals yellow, other characters various

C. Biennial or perennial ; fls. pedicellate, petals generally over 6 mm. long

D. Leaves linear or wider

E. Siliquas subpatent

[F. Plant grey, stem very leafy, leaves linear to oblong-spathulate, petals 12–18 mm. long . *E. thyrsoideum* Boiss.]

F.¹ Plant greenish, stem usually less leafy, leaves more spathulate, petals 6–11 mm. long
E. nasturtioides Boiss. et Haussk.

E.¹ Siliquas strict, leaves grey, obovate-oblong
E. kurd'cum Boiss. et Haussk.

D.¹ Leaves linear-setaceous, petals 7–10 mm. long
E. aciphyllum Boiss.

C.¹ Annual ; fls. subsessile ; petals 3–6 mm. long
E. sisymbrioides C.A.M.

A.¹ At least some of the leaves dentate ; petals yellow

G. Leaves linear

H. Annual

I. Plant grey ; stem simple ; fls. pedicellate ; petals yellow 10 mm. long ; apex of siliqua retuse . *E. tenuissimum* J. Gay

I.¹ Plant green ; stem branched ; fls. subsessile ; petals (colour unknown) 12 mm. long ; style thinner than siliqua style bilobed
E. tenellum DC.

H.¹ Perennial . . . . . *E. aciphyllum* Boiss.

G.¹ Leaves wider

J. Siliquas spreading

K. Petals 6–7 (rarely 9) mm. long, leaves lanceolate or linear-lanceolate . . . . . *E. repandum* L.

K.[1] Petals 10–12 mm. long, leaves oblong-lanceolate to linear-lanceolate . . . . . *E. gladiiferum* Boiss. et Haussk.

J.[1] Siliquas strict

L. Petals 8–10 (13 ?) mm. long, leaves oblong-lanceolate *E. gayanum* Boiss.

L.[1] Petals 10–18 (rarely 6) mm. long, leaves oblong-spathulate to lanceolate, stem leaves under 4 cm. long *E. pulchellum* (Willd.) Boiss.

Erysimum aciphyllum *Boiss.* (? *E. persepolitanum* Boiss. ; ? *E. filifolium* Boiss. et Haussk.).

Derbend-i-Basian, Sulaimaniya liwa, 1200 m., coppiced *Quercus aegilops* forest on limestone mountain, frequent, yellow, 15.4.1947, *Gillett and Rawi* 7638 ; Acra, Mosul liwa, 31.5.1948, *Rawi* 1414.

These two specimens bear young siliquas which are terete and slightly dorsally compressed.

Bornmüller p. 105 (1911) cites " In kurdissche Bergen östlich von Erbil [Arbil], Abhänge des Kuh-i-Sefin, 1000 m. (16.V.1893 ; no. 865) ", with a note saying that the identification as *E. aciphyllum* is not quite certain. There is a discussion of the nomenclature of this species by Meikle in Kew Bull. 99 : 1954.

This species is very closely allied to the Persian *E. persepolitanun* Boiss. and may not be specifically distinct, although other specimens at Kew named as *E. aciphyllum* all come from Asia Minor. *Guest* 2082 was named in " The Rustam Herbarium " p. 387 as *E. persepolitanum* ? ; it is without fruit and in a narrow-leaved species the character of bifid or trifid as well as bifid hairs is very difficult to see. *Guest* 2082 may be included here under *E. aciphyllum.*

E. filifolium Boiss. et Haussk. (Suppl. p. 41) was described from a specimen " in rupestribus calcareis montis Avroman Kurdistaniae Persicae 5–6000′ (Haussk. !) ", which is on the border of 'Iraq, if not in it. There is a syntype at Kew in which the fruit shape in transverse section seems a good match for *Gillett and Rawi* 7638 and *Rawi* 11414.

The Caucasian *E. leptophyllum* (MB.) Andrz. is again very close to *E. aciphyllum* but more frequently has remotely dentate leaves, a character not seen in material from Asia Minor or 'Iraq, although specimens with dentate as well as some with entire leaves occur in Persia. In view of the critical nature of this group, it seems best for the present to include all the 'Iraq material under the one name *E. aciphyllum* which has already been recorded in the literature on 'Iraq.

E. gayanum *Boiss.*

Tarshin, below Ser Kurawa, Arbil liwa, 2400 m., thorn-cushion zone on metamorphic rock, deep yellow, 10.8.1948, *Gillett* 9720 ; Jabal Avroman above Darimar, Sulaimaniya liwa, 2100 m., limestone, *Astragalus, Amygdalus, Umbelliferae* community, yellow, occasional, 8.6.1948, *Gillett* 11873 ; Zewiya, Pir Omar Gudrun, Sulaimaniya liwa, 1700 m., mountainside, yellow, native name halakak, 6.6.1948, *Rawi* 12037.

Bornmüller also cites a specimen (no. 867) from Rowanduz, alpine region of Sakri-Sakran.

E. gladiiferum *Boiss. et Haussk.* (fig. 44).

In graminis Pir Omar Gudrun, 3–6000 ft., June 1867, *Haussknecht* ; Jabal Pikasar near Acra, 20.6.1934, *Field and Yusef Lazar* 838 ; Acra, Mosul liwa, yellow, 31.5.1948, *Rawi* 11425 ; Gweija Dagh forestry enclosure, Sulaimaniya liwa, 1100–1200 m., limestone mt., denuded of *Quercus* forest, yellow, frequent, 4.6.1948, *Gillett and Rawi* 11670 ; Gweija forestry enclosure, Sulaimaniya liwa, 1100 m., limestone, mountain *Quercus* forest destroyed, yellow, 1.3.1948, *Gillett and Rawi* 10612 ; Qarachitan, Sulaimaniya liwa, 900 m., limestone, *Quercus* forest destroyed, pale yellow, indumentum very variable, 18.4.1947, *Gillett* 7723, 7723A.

[**E. kurdicum** *Boiss. et Haussk.* e descr.

Boissier (Suppl. 38 : 1888) records this from " in graminosis montium Schahu et Avroman Kurdistaniae Persicae, 5–7000′, *Haussknecht* ". The locality is on the border of 'Iraq, if not actually in it. The flowers were originally described as " mediocribus luteis ".

Distr. Persia.].

E. nasturtioides *Boiss. et Haussk.*

Kodo near Haji Omran, Arbil liwa, 2500–2800 m., mountainside, 22.6.1947, *Rawi* 9192 ; Ser Kerawa, Arbil liwa, 3000 m., among igneous or metamorphic rocks, subalpine zone, 11.8.1947, *Gillett* 9745.

This species is very closely related to *E. gelidum* Bunge, represented at Kew by material from Asia Minor and " Kurdistan " (coll. Olguin). As ripe siliquas of *E. gelidum* have not been seen, it is difficult to say if the two species are conspecific or not.

Distr. N. 'Iraq, Persia.

E. oleifolium *J. Gay.* ?

Dsjebel Sindsjar [Jabal Sinjar], Apr. 1862, *Schäfli* 12.

Handel-Mazetti p. 48 (1913) records this species from " Wüste zwischen Haditha und Baghdadi unter Anah Nr. 801 am Euphrat ".

Schläfli 12 bears no fruit but the petals appear in sicco to be purple. The lower leaves are entire which suggests *E. blancheanum* Boiss. or *E. oleifolium* rather the *E. purpureum* Auch. *E. blancheanum* (Palestine, Syria and the Jordan) is not very clearly distinguished from *E. oleifolium* (Persia) and Jabal Sinjar is about halfway between the two previously known distributions. It, therefore, seems best to include *Schläfli* 12 as *E. oleifolium* ?

Distr. Persia.

[**E. pulchellum** *Willd.* ?

Expdt. to the Euphrates, *Chesney* 111.

This specimen does not show mature silicules and is, moreover, only very doubtfully from 'Iraq.

Distr. Thrace, Cauc., Asia Minor.].

E. sisymbrioides *C.A.M.*

Anthony p. 280 (1935) records this from Tabar.

Distr. Asia Minor, N. Pers., Afghan., N. Asia.

E. strophades *Boiss.*

5 km. N.W. of Rawa, Duleim liwa, 190 m., gypsaceous hills, dry steppe, white, occasional, 29.3.1947, *Gillett and Rawi* 7074 ; Mesopotamia, *Aucher* 192.

Aucher's specimen is type material, it may come from Syria or Turkey rather than 'Iraq.

E. tenellum *DC.* e descr.

Boissier **1,** p. 190 (1867) cites the type specimen of Olivier's from between Aleppo and Mosul, possibly not in 'Iraq. Zohary p. 66 (1950), however, records this species from the Jabal Sinjar, Kirkuk and Jazira Areas.

The original description gives the siliquas as " patulis ? " and as " juniores erectiusculae ".

E. tenuissimum *J. Gay.*

Zohary (in Pal. Journ. Bot. J. ser. **4,** 235 : 1949) records this from Amadia and the Sulaimaniya area. There is only a fragment of the flower attached to Gay's MS notes at Kew. The characters given above in the key are taken from Boissier and from Gay's notes.

[**E. thyrsoideum** *Boiss.*

Kurdistan [Persia], *Olguin.*

This has not been recorded from 'Iraq. *Sintenis* 1261, 1685 from Turkey show some teeth on the leaves as well as a tendency for the basal rosette to wither and link this species with *E. gladiiferum.*

Distr. Asia Minor, Pers.].

Erysimum sp.

Sulaimaniya, a dwarf yellow flowered—relatively large—crucifer, Apr. 1920, *Graham* 718.

This specimen seems to be the same species as " in gramin. M. Schahu, Kurdistan, Jul. 1867, *Haussknecht* ". The plants are annual, about 4–10 cm. tall, the leaves are linear tapering and with rather remote teeth, the hairs all bifid, and the petals 10–12 mm. long. They appear related to *E. tenellum* J. Gay and *E. tenuissimum* DC. but in the absence of fruit and in view of the obscurity surrounding these two species cannot be named specifically here.

Euclidium syriacum (*L.*) *R. Br.* (fig. 4)

In montis Kuh-Sefin reg. infer. supra pagum Schaklava (ditionis Erbil [Arbil]), 1000 m., 15.5.1893, *Bornmüller* 913 ; Salahaddin forestry enclosure, Arbil liwa, 18.4.1948, limestone, *Quercus aegilops* forest, coppiced, newly turned soil by road, 900 m., *E. Chapman* 11975 ; Haji Omran, Arbil liwa, *Astragalus* thorn-cushion zone, on igneous or metamorphic rocks, 1750 m., 3.6.1948, *G. Chapman* 12294 ; Baghdad, Tarmiya, 3 ft. high tangled thickets on side of canal bank, no leaves or flowers available, 2.5.1955, *Haines* W141.

Distr. Brit. Is. (casual), E. Eur., Or., N. Asia, N.W. India.

Farsetia aegyptia *Turra* ?

6 km. east of As Salman, Southern desert, 200 m., sandstone crags in wadi, subdesert, occasional, corolla brownish yellow, 24.2.1947, *Gillett and Rawi* 6229 ; Shabicha-Negef, 120 km. N. of Shabicha, Southern desert, on stony slopes, occasional, subshrub, corolla brownish, 27.2.1947, *Gillett and Rawi* 6324.

This species is figured by Haines in Bull. Inst. Fouad Ier du Desert **1,** 115, f.8 : 1951. There are no fruit on Gillett and Rawi's specimens, so that there is some doubt about the species, but the distribution of the various species in the Orient makes *F. aegyptia* the most likely.

Fibigia *Medik.*

A. Petals violet ; silicule substipitate, glabrescent

B. Flowers smaller, style 5–6 mm. long . *F. suffruticosa* (Vent.) Sweet

B.[1] Flowers larger (18–19 mm. long), style 9–10 mm. long
F. suffruticosa var. *macrostyla* Bornm.

A.[1] Petals yellow ; silicule subsessile, stellate tomentose

C. Silicule elliptic-oblong, seed-wing not as wide as seed (fig. 57)
F. clypeata L.

C.[1] Silicule orbicular or orbicular oblong, seed-wing wider than or equalling seed

D. Silicule 20–25 mm. long, 17–20 mm. wide . *F. macroptera* Boiss

D.[1] Silicule 17–20 mm. long, 11–15 mm. wide
F. macroptera Boiss. var. *microcarpa* Boiss.

Fibigia clypeata (*L.*) *Medik.* (fig. 57)

Derbend-i-bazian, Sulaimaniya liwa, 1200 m., limestone mountain with coppiced *Quercus aegilops* forest, yellow, frequent, 15.4.1947, *Gillett* 7637 ; Sefin Dagh above Shaqlawa, Arbil liwa, 1500 m., limestone mountain *Quercus* forest formation, *Gillett* 8141 ; Acra mountain, Mosul liwa, 1300 m., limestone mountain, yellow, 26.3.1947, *G. Chapman* 8399 ; Gweija Dagh, Sulaimaniya liwa, 1300 m., limestone mountain *Quercus* forest destroyed, yellow, 17.4.1947, *Rawi* 8955 ; Jabal Sinjar, north of the town, Mosul liwa, 1100 m., limestone mountain with crippled *Quercus aegilops* forest, 26.5.1948, *Gillett* 11108 ; Zewiya, Pir Omar Gudrun, Sulaimaniya liwa, 1700 m., 6.6.1948, *Rawi* 12053.

F. macroptera *Boiss.*

Babirma, Mosul liwa, 800 m., 9.5.1947, *Rawi* 8545C.

Boissier (Fl. Or. Suppl. 48 : 1888) cites a specimen of Haussknecht's from Pir Omar Gudrun as this species and Handel-Mazetti p. 51 (1913) records it from the Jabal Sinjar (no. 3181).

The original description of var. *microcarpa* is " Siliculae 6 nec 9–10 lineas latae " (Boiss. Fl. Or. Suppl. 48 : 1888), but there are intermediates between the variety and the typical form.

The distinction, given above between *F. clypeata* and *F. macroptera* seem to hold fairly well for most of the 'Iraq material, but there are two specimens at Kew (Armenia, *Szovits* and Transcaucasia : Armenia, distr. Dara, Jexe Donduran, 8.8.1931, *coll. illeg.*) which show elliptic-oblong silicules and wide-winged seeds. *Gillett* 5810, from Bida Makrun, Sulaimaniya liwa, also shows more oblong silicules than the other specimens from 'Iraq.

There is a somewhat comparable variation in silicule width in *F. suffruticosa* (Vent.) Sweet and *F. eriocarpa* (DC.) Boiss. This rather suggests that *F. macroptera* may not be a distinct species from *F. clypeata* but *E. clypeata* occurs in the Balkan Peninsula where *F. macroptera* is not found. Reducing *F. macroptera* to a subspecies might have much to recommend it, but would raise the question whether *F. rostrata* (Schenk) Boiss., *F. macrocarpa* (Boiss.) Boiss. and *F. obovata* Boiss. ought not to be similarly reduced ; a matter beyond the scope of the present paper.

F. suffruticosa (*Vent.*) *Sweet* var. **macrostyla** *Bornm.* in Fedde Repert. Beih. **89,** 45 (1936).

Jabal Avroman, spur N. of Biyara, Sulaimaniya liwa, 1600–1800 m. limestone, coppiced *Quercus aegilops* forest, purple, occasional, 7.6.1948, *Gillett* 11799.

The original description reads " differt a typo floribus majoribus 18 19 mm. usque longis, stylo 9–10 (nec 5 6) mm. longo ". Type material is at Kew (Armenia : Egin, Isek-Medan, in saxosis, 18.4.1890, *Sintenis* 2687).

[*Fibigia multicaulis* (Boiss. et Hoh.) Boiss. has been collected by Haussknecht on Avroman and Schahu on the 'Iraq -Persian border. It differs from the species above in the calyx being equal at the base (not bisaccate), filaments all without teeth (not smaller filaments dentate rarely edentulate) and in the wingless seeds (not winged). The petals are yellow and the silicules orbicular].

[*F. macrocarpa* (Boiss.) Boiss. was collected by Kotschy as " Pl. Mesopot., Kurdistan & Mossul " ; very near *E. macroptera*, with ovate-elliptic silicules 20–29 mm. long, 15–20 mm. wide].

Goldbachia laevigata (*MB.*) *DC.* var. **ascendens** *Boiss.* Fl. Or. **1,** 243 : 1867 (*G. torulosa* DC.). (fig. 30)

Nr. Chaldaea, Sept. 1928, *Dr. Leon Legrain* 9 (comm. *H. Witte*, H 1374).

The variety differs from the typical in the deflexed peduncles and siliquas curved upwards ; in var. *genuina* Boiss. the siliquas are pendulous.

Graellsia saxifragifolia (*DC.*) *Boiss.* (fig. 20)

Qara Dagh, Sulaimaniya liwa, 1700 m., limestone crags, north aspect, white, locally common, 23.4.1947, *Gillett* 7925 ; Jabal Avroman above Darimar, Sulaimaniya liwa, 2250 m., limestone crags above the tree limit, north aspect, white, locally common, 8.6.1948, *do.* 11884.

Hesperis *L.*

A. Petals purple or red-purple or pink

B. Stem and leaves long pilose hairs (not glandular) ; petal-laminae oblong-linear

C. Petals purple or red purple, lamina up to 9 mm. long

D. Plant pilose ; radical rosette well developed at flowering time ; stem leaves up to 2 cm. wide . *H.* aff. *persicae* Boiss.

D.[1] Plant glabrescent or with a few pilose hairs ; lower parts unknown ; stem leaves up to 4 cm. wide ; a taller plant ? *H.* aff. *matronale* L.

C.[1] Petals pink, lamina 15–17 mm. long . *Heperis* sp. (*Rawi* 8683)

[B.[1] Stem and leaves pubescent with short branched hairs laminae purple-violet elliptic spathulate . *H. biscuspidata* (Willd.) Boiss.]

A.[1] Petals brownish veined with purple or unknown (where unknown then indumentum very short and scabrid)

C. Indumentum of short fairly dense glandular hairs as well as few long eglandular hairs ; petals brownish veined with purple ; siliqua terete . . . . . *H. rupestris*

[C.[1] Indumentum of very short eglandular hairs ; petals ? ; siliqua somewhat compressed incurved . . . . *H. scabrida* Boiss.]

The 'Iraq species are not well known. Ripe fruit with flowers of the same species, and the lower parts of the plants are required.

Hesperis aff. **matronale** *L.*

Jabal Avroman above Biyara, Sulaimaniya liwa, upper slopes, limestone, eaten by sheep and gathered by children for its beauty, purple, native name shaubor (Kurdish), 6.6.1948, *Gillett* 11738 ; Jabal Avroman, spur north of Biyara, 1600 m., limestone coppiced *Quercus* forest, occasional, purple, 7.6.1948, *do.* 11816 ; Jabal Avroman above Darimar, 1800 m. and over, limestone, *Astragalus*, *Amygdalus*, *Umbelliferae* community, purple, fruiting material of 11816 ? but note leaves hispid at margin, common, 8.6.1948, *do.* 11872.

The specimens are much less densely hairy than "*H.* aff. *persicae* " cited below, almost glabrescent in 11872. The young siliquas of 11872 are erect spreading and glabrous. Bornmüller (p. 299) describes *H. straussii* from Kerind on Noa-Kuh in Persia, which the description is not unlike the specimens cited above.

H. hyrcana Bornm. et Gauba (in Fedde Repert. **49,** 254 : 1940) from N. Persia is described as near *H. matronalis*, but it has long white hairs on its vegetative parts, violet-purple wide oblong petal-laminae and shortly pubescent erect-patent siliquas. *H. matronalis* in Europe varies considerably and the limits of the species especially in the Balkan Peninsula, are not easily defined.

H. aff. **persicae** *Boiss.*

Marmarut Mt. (nr. Rowanduz), on 4000 ft., on stony mountain side, 19.4.32, *Guest* 2085 ; Haji Omran (on Persian frontier), Arbil liwa, 6500 ft., red-purple flowers, 25.4.1951, *Mooney* 4262 ; Haji Omran, 1800 m., slates of nappe zone, S. aspect, *Astragalus* etc. community, purple, 16.5.1948, *G. Chapman* 11181.

Guest 2085, being without colour notes, was previously identified as *H. aladabadensis* Stapf, but as it matches *Mooney* 4262 and *Chapman* 11181 in its other characters, it is almost certainly the same species. This species appears to be perennial, is covered by long pilose hairs and the lower leaves are coarsely dentate or lobate-dentate. The pedicels are shorter than the calyx and the petal-laminas oblong-linear. Siliquas are unfortunately absent but in Mooney's specimen the withered flowers are sharply deflexed, and with glabrous ovaries. It seems unwise to name these plants in the absence of fruiting material from 'Iraq.

H. persica is described by Boissier as having " petalis fuscis linearibus " but Persian material at Kew has " fls. dark purple " (*Cowan and Darlington* 2134), " fl. purple " (*do.* 2066), " brick-red colour " (*Trott* 994). *H. persica* is characterized by the long pilose indumentum narrow petal-laminas and deflexed mature siliquas. *H. aladabadensis* Stapf and *H. meda* Stapf are described as having " corollis lividis rarius luridopurpureis " and " luride purpureis vel lividis " are probably at most varieties of *H. persica* from the descriptions. *H. aladabadensis* has been reduced to varietal rank by Bornmüller (in Beih. Bot. Centrabl. **27,** 2, p. 300 : 1910).

H. rupestris *Boiss. et Noë.*

Pir Omar Gudrun above Qarachitan, Sulaimaniya liwa, 1300–1500 m., limestone mt. with coppiced *Quercus aegilops* forest, shady places, occasional, corolla brownish veined with purple, 19.4.1947, *Gillett* 7765 ; Penjwin, Sulaimaiya liwa, 1400 m., 23.4.1947, *Rawi* 8832 ; Jabal Sinjar above Kursi, Mosul liwa, c. 800 m., limestone mountain with relics of *Quercus* forest and terraced fig gardens, occasional, 24.5.1948, *Gillett* 11011.

Gillett 11011 shows mature siliquas as does " Asia Minor : Mardin in declivibus saxosis, June 1888, *Sintenis* 873." These are spreading, terete, glandular pubescent, striate, tapering towards the apex, and 6·5–12·5 cm. long, and 3–4 mm. wide. The peduncles are 6–23 mm. long, c. 2 mm. wide.

[**H. scabrida** *Boiss.*

Boissier (p. 235) cites " in Mesopotamia (Auch. exs. 1661) ", but this has not been seen by me, nor is it certain to be in 'Iraq. The petals are not described by Boissier.].

Hesperis sp.

Matina, Mosul liwa, 200 m., mountainside, pink, 15.5.1947, *Rawi* 8683.

This shows some resemblance to *H. armena* Boiss., but it has larger cauline leaves, pink not purple petals, and, to judge from two immature siliquas, deflexed glabrous fruit. It is possibly a new species but the material is rather inadequate to describe.

[There is material at Kew of *H. bicuspidata* (Willd.) Boiss. collected by Layard and Brant and Strangways in " Kurdistan ", but this is not necessarily from 'Iraq].

Hymenolobus procumbens (*L.*) *Nutt.* (*Hutchinsia procumbens* L.; *Capsella procumbens* (L.) Fries).

Ajuba, in a hollow of gypsum rocks, petals yellow, Mar. 1918, *Graham* 180 (B.M.); Rowanduz, 27.3.1930, *Guest* 613; Qaiyara, Mosul, 640 ft., abundant on waste ground, round ants nests and often recently disturbed ground, corolla white, young fruit green, shining, slightly flattened, leaves and stem bright green, upright habit, 1.4.1939, *Bayliss* 9; Karbala, Karbala liwa, 30 m., weed in date-citrus orchards, said to be edible by people, locally abundant, native name reshad barr, 8.3.1947, *Gillett and Rawi* 6355; Daltawa, Diyala liwa, 70 m., date gardens, white, eaten by people, common, 18.3.1948, *Gillett and Rawi* 10219.

Anthony p. 28 (1935) lists this from Jabal Hamrin, Ramadi, Ambadi, Ajuba and Amara under the synonym *Capsella procumbens*.

[**Iberis** sp.

Garden of British Consulate, Kirkuk, Kirkuk liwa, 350 m., cultivated with irrigation, pink or blue, ornamental, seed from England, 20.5.1947, *Gillett* 8367].

Iberis odorata L. (fig. 23) is common as a wild plant in N. 'Iraq. Specimens have already been cited in " The Rustam Herbarium " p. 388. The outer petals are much less enlarged and radiating than in many species in this genus.

Isatis *L.*

A. Orbicular silicules with a thickened loculus surrounded by a membranous wing

B. Apex of silicule not emarginate, wing flat, silicule glabrous or tomentose

C. Silicule glabrous or tomentose, apex rounded or obtuse, wing flat or undulate (fig. 51) . . . . . *I. latisiliqua* Stev.

C.[1] Silicule glabrous, apex ± acute, wing flat . *I. besseri* Trautv.

B.[1] Apex of silicule emarginate, wing undulate, silicule tomentose *I. aff. undulatae* Boiss.

A.[1] Oblong or linear fruit with a thickened loculus, winged at apex

D. Loculus surrounded by a thickened wing, fruit not constricted

E. Loculus about centre or nearer base of fruit ; biennial or perennial

F. Fruit 15–20 mm. long, linear-oblong, thickened wing between loculus and pedicel ; lower cauline leaves entire, somewhat fleshy ; stem 6–10 mm. diam. towards base *I. glauca* Boiss.

F.[1] Fruit 9–20 mm. long, cuneate-oblong, scarcely any wing round loculus, lower cauline leaves dentate, membranous ; stem up to 6 mm. diam. towards base . *I. cochlearis* Boiss,

E.[1] Loculus nearer apex than base of fruit (fig. 56) ; annual *I. aleppica* Scop.

D.[1] Loculus not surrounded by a thickened wing, fruit biconstricted

G. Fruit densely white lanate . . . . *I. guestii* Blakelock

G.[1] Fruit glabrous . . . . . *I. glabrisiliqua* Blakelock

A difficult genus to divide into species as there is so much variation in fruit size and tomentum within one species.

Isatis besseri *Trautv.*

Bornmüller p. 123 (1911) records this from " Alpine Geröllhalden des Sakri-Sakran (Kurdistan), [near Rowanduz] 2100 m. (23.VI.1893 ; no. 917) ". He mentions two forms, one with cordate ovate fruits and the other with cordate ovate-lanceolate fruits.

I. cochlearis *Boiss.*

Jabal Bekheir, Mosul liwa, 1000 m., 8.5.1947, *Rawi* 8455A ; Dohuk. 13.5.1947, *do.* 8647A ; Acra, 31.5.1948, *Rawi* 11455, 11455A.

The plant is biennial or perennial and not so stout as *I. glauca*. The silicules of 8455A are tomentose ; those of 8647A are glabrous. The mature siliquas vary from 9–20 mm. in length and from glabrous to tomentose. In the 'Iraq material there is a gradation from small glabrous fruits to large tomentose ones but there seems no sharp dividing line between the various forms.

I. aff. **glabrisiliquae** *Blakelock.*

Pir Omar Gudrun above Qarachitan, Sulaimaniya liwa, 1050–1300 m., limestone slopes with coppiced *Quercus aegilops*, a massive glaucous plant with brilliant yellow flowers, common, 18.4.1947, *Gillett* 7725.

The terminal wing of the fruit is smaller than in *I. glabrisiliqua*. The fruit of our specimen are too immature to give it a more definite name.

I. glauca *Boiss.* var. **collina** (*Boiss.*) *Boiss.* in Fl. Or. **1,** 379 (1867).

Pir Omar Gudrun, 5000 ft., June 1867, *Haussknecht.*

This is described as differing from the type of " silicula glabra latit. sua 3½ plo longior ".

I. latisiliqua *Stev.* (fig. 51).

Pir Omar Gudrun above Qarachitan, Sulaimaniya liwa, 1300–1500 m. limestone mt. with *Quercus aegilops* forest (coppiced), yellow, frequent 19.4.1947, *Gillett* 7764 ; do. 1900 m., 1800 m., native name lutawana (Kurdish), 7.6.1948, *Rawi* 12102, 12134, 12134A ; Haji Omran, 6000–7000 ft., tough herb with yellow flowers, 25.4.1951, *Mooney* 4274.

Boissier described (in Fl. Or. Suppl. 64 : 1888) var. *gudrunensis* as " Collo suffrutescens tota glauca velutina, caules humiles corymboso-ramosi. Siliculae totae tomentellae, ovatae, vel ellipticae (7–12 lineas longae 5 latae) " based on a specimen of Haussknecht's from Pir Omar Gudrun. Some of the specimens cited above approximate to this variety. There is a sheet of Haussknechts collecting from this locality at the British Museum, but it only shows immature siliquas.

I. aff. **undulatae** *Boiss.*

Penjwin, Sulaimaniya liwa, 1600 m., 9.6.1948, *Rawi* 12230.

In some specimens of *I. undulata*, not from 'Iraq, the silicule is tomentose, in some glabrous. In type material at Kew (in Cappadocia ad Euphratem, *Aucher-Eloy* 212), the silicule is 12 mm. long and 11 mm. wide, in *Rawi* 12230 it is 25 mm. long and 22 mm. wide. In *Kotschy* 353, cited by Boissier, it is 18 mm. long and 11 mm. wide.

Lepidium *L.*

A. Upper stem leaves linear or pinnatisect or ovate to lanceolate not amplexicaul-cordate

B. Lower leaves always pinnatisect

C. Petals white or pinkish ; silicule 2–6 mm. long, winged at apex, emarginate, style present

D. Erect; fruiting raceme loose with pedicels not widened, silicules 5–6 mm. long orbicular-ovate ; leaf-segments acute or obtuse *L. sativum* L.

D.[1] Prostrate ; fruiting raceme dense with widened and flattened pedicels, silicules 2–3 mm. long, oblong ; leaf-segments obtuse (fig. 8) . . . . . *L. aucheri* Boiss.

C.[1] Petals absent ; silicule 1·5–2 mm. long, almost unwinged at apex, emarginate, stigma sessile . . . . . *L. ruderale* L.

B.[1] Leaves dentate or entire (rarely pinnatisect), ovate to lanceolate petiolate ; silicules c. 2 mm. long, not winged (fig. 9) *L. latifolium* L.

A.[1] Upper stem leaves orbicular entire, base cordate amplexicaul, lower leaves pinnatisect . . . . . *L. perfoliatum* L.

Lepidium latifolium *L.* (fig. 9).

Kerkuk, Assyria, May 1867, *Haussknecht* ; Jabal Bekheir near Zakho, 16–18.6.1934, *H. Field and Yusef Laxar* 834.

L. perfoliatum *L.*

Qaiyara, near Mosul, 640 ft., abundant on old arable land on river plain, upright annual, leaves bright green, lower ones yellowing at time of flowering, calyx and corolla greenish yellow, 15.3.1939, *Bayliss* 27 ; Sulaimaniya, 800 m., garden weed, flowers yellowish, seen in one place only, 16.4.1947, *Gillett* 7661 ; in den Ebenen am Dschebel-Hamrin [Jabal Hamrin], auf der Route Baghdad–Kerkuk, 400–500 m., 28.4.1893, *Bornmüller* 911 (*non vidi*).

Malcolmia *R. Br.*

A. Calyx bisaccate at base

B. Stem leaves amplexicaul

C. Petals violet (fig. 45) . . . . . *M. crenulata* (DC.) Boiss.

C.[1] Petals yellow . . . . . *M. exacoides* (DC.) Spreng.

B.[1] Stem leaves not amplexicaul petiolate ; petals mauve or white

D. Calyx 8–10 mm. long ; petal-laminae 4–6 mm. long ; style long-tapering 4–5 mm. long very acute ; siliqua not only or slightly torulose . . . . . *M. maritima* (L.) R. Br.

D.[1] Calyx 2–5 mm. long ; petal-laminae 1–5 mm. long ; style not or shortly tapering up to 2 mm. long acute to truncate ; siliqua torulose

E. Siliqua glabrous (fig. 41) ; petal-laminae 4–5 mm. long ; calyx 3–4 mm. long . *Maresia pulchella* (DC.) O. E. Schulz

E.[1] Siliqua pubescent ; petal-laminae 1–3 mm. long ; calyx 2–5 mm. long

F. Siliqua under 1 mm. wide ; petal-laminae 1–2 mm. long ; calyx 2–3 mm. long, leaves entire to pinnatisect ; style truncate . . . . . *Maresia nana* (DC.) Battand.

F.[1] Siliqua 1·5 mm. wide ; petal-laminae 1–3 mm. long ; calyx 2–5 mm. long ; leaves entire ; style shortly tapering 0·5–1 mm. long, obtuse or acute . . . . . *Eremobium*

A.[1] Calyx not bisaccate at base

G. Siliqua terete torulose, up to c. 1 mm. thick, straight curved or circinnate at apex ; petal-laminae linear-oblong about thrice as long as sepals . . . . . *M. grandiflora* (Bunge) O. Kuntze

G.[1] Siliqua subtetragonous, sometimes over 1 mm. thick, not torulose, straight or curved not circinnate, petals up to twice as long as sepals or less

H. Caulescent, with leafy stems, inflorescence elongate, flowers and siliquas various

I. Petal-laminae obovate-oblong to oblong-linear, mauve or pink ; flowers usually pedicellate ; siliquas over 4 cm. long, pubescent or glabrous, of equal width for entire length *M. africana* (L.) R. Br.

I.[1] Petal-laminae linear, white ; flowers subsessile (fruiting pedicel up to 2 mm. long) ; siliquas up to 2·7 mm. long, thickened and strigose towards base . . *M. strigosa* Boiss.

H.[1] Stems short (up to 5 cm. high), basal rosette of leaves well-developed, petals ± linear, flowers subsessile in short dense inflorescences (there are flowers at ground level in centre of rosette), siliquas up to 4 cm. long . . . *M. runcinata* C.A.M.

The letter " *M.*" followed by a specific epithet in the above key stands for *Malcolmia*. As the two genera *Maresia* and *Eremobium* have a strong resemblance to *Malcolmia* in general appearance, they are included here for the sake of convenience although they are kept separate in the key to the genera (pp. 498, 502).

Malcolmia africana (*L.*) *R. Br.*

Bornmüller p. 108 (1911) cites the following as *Malcolmia scorpioides* (Bge.) Boiss. var. vel. sp. aff ! " Babylonien : Baghdad (20.IV.1893 ; no. 871) ; Assyrien : Am Dschebel-Hamrin (23.IV.1893 ; no. 876 ; no. 873, f. siliquis contortis) ". These specimens I have not seen.

Bunge 101 (Herb. Hook.) at Kew appears to be only a depauperate plant of the very variable *M. africana*.

M. grandiflora (*Bunge*) *O. Kuntze* (*M. bungei* Boiss.).

Table Mountain, delicate flowers white with red spots long narrow claw, Apr. 1920, *Graham* 626 ; Jabal Hamrin on Baquba–Khaniqin road, 160 m., sandy gypsaceous hills, border of steppe and subdesert, wadi beds, purple, frequent, 11.4.1947, *Gillett & Rawi* 7340 ; 10 km. S. of Samawwa, Diwaniya liwa, 20 m., subdesert, sandhills, mauve, native name shigar, 22.2.1947, *Gillett* 6132 ; 8 km. E. of Shitatha, Karbala liwa, 60 m., sandy wadi beds, subdesert, deep red-purple, locally abundant, 11.3.1947, *Gillett & Rawi* 6476 ; 15 km. west of Ramadi on road to Hit, Duleim liwa, 100 m., sandy gypsaceous subdesert, purple, occasional, leaves can be eaten by people, native name shigarr, 24.3.1947, *Gillett & Rawi* 6776.

var. *glabrescens* (Boiss.) Burtt et Lewis in Kew Bull. 293 (1949) (*M. bungei* Boiss. var. *assyriaca* Bornm.) differs only in the glabrous stem and leaves hairy at the margin. The typical form has a hairy stem and leaves hairy on both surfaces. In material from 'Iraq both varieties are often found in the same gathering.

M. runcinata C.A.M.

Nr. Chaldaea, Sept. 1928, *Dr. Leon Legrain* comm. *H. Witte* 5.

Anthony p. 280 (1935) records this species from Ramadi.

M. strigosa *Boiss.*

Anthony p. 280 (1935) cites a specimen from Ramadi.

Maresia *Pomel* emend. *O. E. Schulz.*

A. Calyx 2–3 mm. long, slightly bisaccate ; lamina of petals 1–2 mm. long ; siliqua appressed pubescent . . . *M. nana* (DC.) Battand.

A.[1] Calyx 3–4 mm. long, bisaccate, lamina of petals 4–5 mm. long, siliqua glabrous . . . . . *M. pulchella* (DC.) O.E.S.

Maresia nana (*DC.*) *Battand.* (*Malcolmia confusa* Boiss.).

Anthony p. 280 (1935) cites this from Jabal Hamrin under *Malcolmia*.

Maresia pulchella (*DC.*) *O. E. Schulz* (*Malcolmia pulchella* Boiss.) (fig. 41).

Anthony p. 280 (1935) records this from Shargat under *Malcolmia*.

Matthiola oxyceras *DC.*

There are notes on this species and its nomenclature by Zohary in Pal. Journ. Bot. J. ser. **2,** 157 (1941) and by Burtt and Lewis in Kew Bull. 295 (1949). The latter point out that *M. longipetala* (Vent.) DC. under which name Zohary includes *M. oxyceras*, was a species with pedicels figured as some 8 mm. long. All the 'Iraq material so far seen has subsessile flowers.

Var. *forcipifera* Boiss. (fig. 50) differs from the typical form in the fruit horns being incurved ; they are deflexed or spreading in the typical form. The flower-colour in 'Iraq is described in collectors' notes, as livid yellow becoming purple, mauve variable, livid yellow-purple, livid-purple, mauve, purple, mauve with white or yellow claw, or pink.

Anthony p. 280 (1935) records *M. humilis* DC. from Kizil [Qizil] Robat. But as *M. humilis*, like *M. bicornis* (S. et S.) DC. and *M. livida* DC., is only distinguished with difficulty from *M. oxyceras*, it seems best not to list *M. humilis* as an 'Iraqi species until this group of *Matthiola* is better understood.

[**Myagrum perfoliatum** *L.* (fig. 1)

" Mesopotamia, *Schäfli* " is cited by Boissier **1,** p. 371 (1867) but may not be from 'Iraq].

Nasturtium *R. Br.*

A. Petals white ; siliquas oblong 13–18 mm. long ; leaves pinnate (fig. 36) . . . . . *N. officinale* R. Br.

A.[1] Petals yellow ; siliquas ovoid 3–7 mm. long ; leaves very variable simple to pinnate (fig. 37) . . . . . *N. amphibium* (L.) R. Br.

Nasturtium amphibium (*L.*) *R. Br.* (*Rorippa amphibia* (L.) Bess.).

Penjwin valley, Sulaimaniya liwa, 1400 m., yellow, common, 8.6.1948, *Rawi* 12162.

Rorippa and *Nasturtium* are treated as one genus by Schulz, although many European botanists keep them distinct.

Neslia *Desv.*

A. Silicule wider than long, not 4-ribbed . . *N. paniculata* (L.) Desv.

A.[1] Silicule as wide as long, 4-ribbed (fig. 5) *N. apiculata* F.M. et Avé-Lall.

Neslia paniculata (*L.*) *Desv.* (*Vogelia paniculata* (L.) Hornem.).

Nábělek p. 32 (1923) lists this from " distr. Serizor : Handrian-Dar supra pagum Rewanduz ad septentr. ab oppido Erbil (Arbela), in herbidis alt. ca. 1200 m., 23.V.1910 (No. 1281) ". Bornmüller p. 122 (1911) cites a specimen from Kuh-i-Sefin, near Schaqlawa 100 m. (no. 914) under the name *Vogelia paniculata* (L.) Hornem.

Notoceras bicorne (*Ait.*) *Amo* (*N. canariense* R. Br). (fig. 29)

5 km. east of As Salman, Southern desert, 200 m., subdesert, alluvium, corolla greenish yellow, pod a little inflated, very inconspicuous, 24.2.1947, *Gillett and Rawi* 6202 ; 3 km. east of Hit, Duleim liwa, 100 m., gravelly subdesert, pods slightly inflated, occasional, 24.3. 1947, *Gillett and Rawi* 6837.

Zohary (in Pal. Journ. Bot. ser. J, **4,** 235 : 1949) lists this from the Dohuk district.

Peltaria angustifolia *DC.* (fig. 34)

Jabal Sinjar, north of the town, Mosul liwa, 1100–1400 m., limestone mountain with coppiced *Quercus aegilops* forest among loose stones, white, frequent, 26.5.1948, *Gillett* 11105.

Raphanus *L.*

A. Calyx closed with erect sepals ; petal-lamina violet or white with conspicuous veins ; siliquas erect-spreading ; seeds ovoid

B. Siliquas thin 1·8–6 mm. diam., often constricted between seeds with very firm walls, breaking into transverse joints

C. Siliquas with a beak 0·6–2 cm. long ; ovary 4–11-ovulate *R. raphanistrum* L.

C.[1] Siliquas with a beak 1·5–6 cm. long ; ovary 2–5-ovulate *R. rostratus* DC.

B.[1] Siliquas thick 8–15 mm. diam., not constricted between seeds, walls fleshy thick, not breaking into joints . . . . . *R. sativus* L.

A.[1] Calyx open with erect spreading sepals ; petal-lamina yellow not conspicuously veined ; siliquas pendulous, bristly, seeds oblong *R. aucheri* Boiss.

R. raphanistrum *L.*

Anthony p. 282 (1935) records this from Jabal Hamrin and Baghdad.

Raphanus rostratus *DC.* var. **pugioniformis** (*Boiss*) *O. E. Schulz* (fig. 58).

Anthony p. 282 (1935) records this from Baghdad as *R. pugioniformis*.

Schulz (p. 202) described this variety as " pistillum pilis conicis adpressis dense vestitum. Siliquae setulis brevibus 0·25–0·5 mm. longis erecto-patentibus scaberrimae ".

Raphanus sp.

Kursi Jabal Sinjar, Mosul liwa, c. 900 m., terraced fig gardens on limestone *Quercus* forest formation, purple, locally common, 25.4.1948, *Gillett* 11009 ; near Mandali, banks of the Ab-i-Naqt river, 9.5.1930, *Guest* 760.

The siliquas in these specimens are probably galled.

Rapistrum rugosum (*L.*) *All.* (fig. 18).

Mindan between Acra and Mosul, Mosul liwa, apparently white flushed with lilac, 30.5.1948, *Rawi* 11356.

Reboudia pinnata (*Viv.*) *O. E. Schulz* (*Erucaria microcarpa* Boiss. 1849 ; *Raphanus pinnatus* Viv. 1824) var. **boissieri** *O. E. Schulz.*

Samuelson (in Svensk Not. Tidskr. **29,** 379 : 1935) records this from a dry wadi bed near Rutba.

Schulz described this variety as leaves tripinnatisect, segments narrow, flowers larger, sepals 4 mm. long, petals 8 mm. long ; stamens 4–5 mm. long, anthers 1·2 mm. long. Siliquas often a little longer, generally glabrous. See key to species of *Erucaria* above (p. 532).

Sameraria *Desv.*

A. Silicule with a wide marginal wing, loculus keeled

B. Silicule emarginate at apex, cordate at base . *S. armena* (L.) *Desv.*

B.¹ Silicule acute at apex

C. Silicule rounded at base . . . . *Sameraria* sp. (*Rawi* 11528)

C.¹ Silicule cordate at base . . . . *Sameraria* sp. (*Rawi* 13724)

A.¹ Silicule with a wide marginal wing and also a shorter and narrower wing on each side of loculus . . . *S. stylophora* (J. et S.) Boiss.

Sameraria armena (*L.*) *Desv.*

Zohary (in Pal. Journ. Bot. ser. J., **4,** 235 : 1949) records this from the Western part of the Syrian desert.

S. stylophora (*Jaub. et Spach*) *Boiss.* (*Tetrapterygium stylophora* Jaub. et Spach).

Rowanduz Gorge, 1500–2500 ft., on the mountain side, 18.4.1932, *Guest* 2093 ; Pir Omar Gudrun above Qarachitan, Sulaimaniya liwa, 1000 m., limestone mountain with coppiced *Quercus aegilops* forest, occasional, yellow, 18.4.1947, *Gillett* 7722 ; Bekhme Gorge, Arbil liwa, 500 m., steep limestone slopes *Quercus aegilops* forest, occasional, yellow, 14.5.1947, *Gillett* 8258 ; Bakirma, Mosul liwa, 800 m., native name marana, 9.5.1947, *Rawi* 8549J ; Matina, Mosul liwa, 1700 m., yellow, 15.5.1947, *Rawi* 8726 ; Gweija forestry enclosure, Sulaimaniya liwa, 1200 m., limestone mountain, *Quercus aegilops* forest destroyed on screes, 31.3.1948, *Gillett and Rawi* 10618 ; Jabal Sinjar north of the town, Mosul

liwa, 900–1300 m., limestone mountain with coppiced *Quercus aegilops* forest, occasional, 26.5.1948, *Gillett* 11082.

7722 has glabrous fruits, in the other specimens the fruits are crispato-pubescent, although Boissier p. 375 (1867) describes it as glabrous. *S. macrocarpa* Boiss. (in Fl. Or. Suppl. 64 : 1888) from Pir Omar Gudrun (*Haussknecht*) does not appear from the description to be very distinct from *S. stylophora*.

Sameraria sp. (fig. 55).

Pir Omar Gudrun above Zewiya, Sulaimaniya liwa, 6.6.1948, *Rawi* 11528.

This is represented by one fruiting specimen. The silicules have long pilose hairs on the loculus and a glabrous wing sparsely pilose at the margin. As *S. armena* is rather variable in the amount of tomentum and the shape of the apex of the silicule, our plant is left undescribed until more material has been seen.

There is a *nomen nudum* of Zohary's (p. 74) which may be the same species.

Sameraria sp.

Helgord [Arl Gird Dagh], Khalana, 1500 m., on hill side, native name sa palaka, 1.7.1954, *Rawi* 13724.

The silicules are very acute at the apex, pilose on the loculus, pubescent on the wings, 12–16 mm. long and 5–10 mm. wide. The leaves are ciliate at the margin and on the midrib.

Schimpera arabica *Hochst. et Steud.* (*S. persica* Boiss.). (fig. 12)

Anthony p. 281 (1935) records *S. persica* Boiss. from the Jabal Hamrin. This species has been sunk in *S. arabica* by Burtt and Lewis (in Kew Bull. 297 : 1950).

Var. *lasiocarpa* Boiss. has papillose-hairy silicules ; they are glabrous in the typical form.

Sinapis *L.*

A. Beak of siliqua 1–4-seeded, sometimes seedless, much hardened

B. Ovary 8–13-ovulate ; beak little compressed, conic or subulate ; seeds in beak mostly ascending.

C. Siliqua glabrous (fig. 42) . . . . . *S. arvensis* L.

C.[1] Siliqua with stiff hairs
S. arvensis L. var. *orientale* (L.) Koch et Ziz.

B.[1] Ovary 4–8-ovulate ; beak strongly compressed, 2-headed, sword-shaped, 1–2 seeds in beak always pendulous ; siliqua with long stiff hairs . . . . . *S. alba* L.

A.[1] Beak of siliqua very long, 2·5–4·5 cm. long, 6–9-seeds, at length fleshily thickened . . . . . *S. aucheri* (Boiss.) O. E. Sch.

Sinapis aucheri (*Boiss.*) *O. E. Schulz.*

Schulz cites "bei Mosul (Aucher-Eloy n. 203 in herb. Boiss.)" and "Ostl. Assyrien: zwischen Kerkuk und Altun-Köprii (J. Bornmüller, It. pers.–turc. n. 932)" as this species.

Sisymbrium *L.*

A. Flowers in axils of leaves; petals c. 3 mm. long; peduncles up to 1 mm. long . . . . . *S. runcinatum* Lag.

A.1 Flowers in a bractless raceme

B. Siliquas tapering strictly adpressed, 10–15 mm. long; peduncles 1–1·5 mm. long . . . . . *S. officinale* (L.) Scop.

B.1 Siliquas ± spreading

C. Siliquas 2–5 cm. long; petals 2·5–7·5 mm. long; peduncle various; uppermost leaves various, if pinnatisect then lobes not narrow linear

D. Young siliquas not exceeding the flowers; peduncles 6–14 mm. long, narrower than siliqua; siliquas tapering only towards apex . . . . . *S. loeselii* L.

D.1 Young siliquas exceeding in height the flowers; other characters various

E. Peduncles 1–3 (rarely 5) mm. long nearly as wide as siliqua; siliqua tapering from the base . . *S. erysimoides* Desf.

E.1 Peduncles 5–14 mm. long, narrower than siliqua; siliqua tapering only at apex

F. Petals 2·5–6 mm. long, narrowly spathulate, mostly scarcely longer than the sepals . . . . . *S. irio* L.

F.1 Petals 7·5 mm. long, widely obovate, longer than sepals; plant hairy . . . . . *S. damascenum* Boiss. et Gaill.

C.1 Siliquas 5–10 cm. long; petals 5–10 mm. long; peduncles up to 10 mm. long generally less, as wide as siliqua; uppermost leaves hastate, or pinnatisect with narrow linear lobes

G. Outer sepals cucullate below apex, spreading; plant green, glabrous or with scattered long hairs; uppermost leaves pinnatisect, segments entire linear or filiform.

[H. Outer sepals shortly cucullate; petals narrowly obovate-cuneate; stigma shortly bilobed; style of fruit 0·5–1·5 mm. long . . . . . *S. altissimum* L.]

H.1 Outer sepals long cucullate; petals with lamina widely obovate, sharply narrowed into a filiform claw; stigma deeply bilobed; style of fruit 3–6 mm. long *S. septulatum* DC.

G.[1] Outer petals scarcely cucullate, suberect ; plant ± villose, grey-green ; upper leaves hastate . . . . *S. orientale* L.

The cucullate sepals in *S. altissimum* and *S. septulatum* show as two short points at the apex of the unopened flower bud.

[Sisymbrium altissimum *L.*

The differences between this species and *S. septulatum* DC. are very slight, those given in the key above are taken from O. E. Schulz. *Guest* 522, 622, which I previously called *S. altissimum*, may possibly be *S. septulatum*. For the moment *S. altissimum* is best regarded as a doubtful species for 'Iraq].

S. damascenum *Boiss. et Gaill.*

Anthony p. 280 (1935) records this from Baghdad.

The characters distinguishing this from *S. irio*, given in the key above, are taken from Schulz (Pflanzenreich. **86,** IV. 105, p. 88 : 1924), but a specimen at Kew, " Jardin du Seraikierat, Damas, 19 Mai 18[?], *Gaillardot* 1981 " shows petals only 4–5 mm. long. The sepals and vegetative parts of this specimen are fairly densely pilose. As this is not the Gaillardot number cited by Schulz from a specimen in the Herbarium Haussknecht (*Gaillardot* 1579 ter), it is probable that there is more than one taxon among Gaillardot's plants from Damascus. Possibly *S. damascenum* is only a variety of *S. irio*.

S. erysimoides *Desf.*

Anthony p. 280 (1935) records this from Ramadi. Desfontaines original description from N. African material has this as " corolla alba ". Schulz (Sisymbreae p. 135) describes the petals as " flava ". Battandier and Trabut (Fl. d'Algérie p. 66 : 1888–90) do not give the flower colour. Willkomm and Lange (Prod. Fl. Hisp. **3,** 797 : 1880) describe the flowers as white. Boissier states that the flowers are yellow. As colour notes on the herbarium specimens are absent it is premature to say if there really is a difference between the W. and E. Mediterranean material.

[S. irio *L.* var. **irioides** (*Boiss.*) *O. E. Schulz* in Pflanzenr. **86,** IV, 105, p. 93 (1924).

Schulz describes this variety as " Petala 4–6 mm. longa. Stylus siliquarum 2·5–3 cm. tantum longarum gracilis, usque ad 1·3 mm. longus " and cites *Aucher-Eloy* 140 " In Mesopotamia ", which may not be in 'Iraq. Boissier p. 218 (1867) states that it differs from *S. irio* in the flowers being twice as large and in the elongate style].

S. officinale (*L.*) *Scop.*

Sefin Dagh above Shaqlawa, Arbil liwa, 1100 m., limestone mt., *Quercus* forest, on rocks, yellow occasional, 9.5.1947, *Gillett* 8078.

S. orientale *L.* (*S. columnae* Jacq.).

Kifri, Kirkuk liwa, 200 m., orchard, yellow, 12.4.1947, *Gillett & Rawi* 7433.

S. septulatum *DC.*

Zohary p. 67 (1950) lists *S. bilobum* (Koch) Grossh. This is presumably the same species as *S. septulatum* DC. Specimens have already been cited in " The Rustam Herbarium " p. 392.

(**S. sophia** L. see **Descurainia**).

(**Tetrapterygium stylophora** *Jaub. et Spach* see **Sameraria**).

Thlaspi L.

A. Silicules 8–10 (rarely 15) mm. long, base rounded, sinus narrow ; stem-leaves ovate entire or subentire . *T. kotschyanum* Boiss. et Hoh.

A.[1] Silicules 5–7 mm. long, base widely cuneate, sinus wide ; stem leaves lanceolate, slightly toothed . . . . . *T. perfoliatum* L.

Thlaspi kotschyanum *Boiss. et Hoh.* (fig. 24)

Kurdistania assyriaca : in mte. Helgurd [Arl Gird Dagh] ditionis Riwandous [Rowanduz], 2300 m., 26.6.1893, *Bornmüller* 899 ; Haji Omran (on Persian frontier), Arbil liwa, fls. white, 25.4.1951, *Mooney* 4260.

The following specimen differs from typical *T. kotschyanum* in having silicules as large as in *T. arvense* i.e. up to 15 mm. long and 15 mm. wide. The seeds, however, are pale brown, smooth and 1·5–2 mm. long as in *T. kotschyanum*. It is possibly only a variety of this species.

Penjwin, Sulaimaniya liwa, 1700 m., mountain side, 9.6.1948, *Rawi* 12265.

Torularia *O. E. Schulz.*

A. Flowers very minute ; petals 2·5 mm. long ; fruiting pedicels 0·5–1 mm. long ; siliquas subattenuate, often acuate or contorted, 15–30 mm. long . . . . . *T. torulosa*

A.[1] Flowers larger ; petals 4–8 mm. long ; fruiting pedicels 2–4 mm. long ; siliquas obtuse at apex, straight, adpressed, up to 9 mm. long *T. tetracmoides*

Torularia tetracmoides (*Boiss. et Haussk.*) *O. E. Schulz* (*Sisymbrium tetracmoides* Boiss. et Haussk. ; *Torularia adpressa* Handel-Mazetti non Trautv.). (fig. 28)

Shargat, Apr. 1920, *Reo* ; Mosul, 16.5.1946, *Rawi* 5637 ; 13 km. N. of Kirkuk, Kirkuk liwa, 400 m., stony hills in moist steppe, abundant, petal blades white, claws purple fruit pubescent, 29.3.1948, *Gillett and Rawi* 10567 ; do., claw violet, fruit glabrous, occasional, *do* 10568.

Specimens were cited under Sisymbrium in " The Rustam Herbarium " p. 392.

Torularia torulosa (*Desf.*) *O. E. Schulz* (*Malcolmia torulosa* (Desf.) Boiss.).

Specimens have been cited under *Malcolmia* in the " Rustam Herbarium " p. 390.

This species of *Torularia* bears a strong superficial resemblance to *Sisymbrium runcinatum*, from which it differs in having white not yellow petals and in the upper portion of the inflorescence being without bracts.

(**Vogelia apiculata** (*F. M. et Avé Lall*) *Vierh.* see **Neslia**).

Zilla spinosa (*Turra*) *Prantl.* (fig. 3)

Shabicha (Southern Desert) also seen between Samawwa and As Salman and Shabicha-Negef, 300 m., subdesert, at edge of alluvium, rather sandy, corolla mauve, occasional, 27.2.1947, *Gillett and Rawi* 6313 ; edge of plateau south of Shithatha, Karbala liwa, 100 m., sandy gypsaceous subdesert, 0·6 m. tall, corolla mauve, frequent, 10.3.1947, *Gillett and Rawi* 6429.

The only spiny Crucifer in 'Iraq.

CAPPARIDACEAE

A. Fruit fleshy ; stipe longer than or ± equalling fruit ; stipules generally spiny . . . . . *Capparis* L.

A.[1] Fruit not fleshy ; stipe shorter than fruit ; no spines

B. Fruit an elongated 2-valved capsule, not inflated . . *Cleome* L.

B.[1] Fruit membranous inflated ± obovoid . . . *Buhsea* Bunge

The key above applies only to the genera as represented in 'Iraq. These notes on the family must be taken as provisional only.

Buhsea trinervia (*DC.*) *Stapf* (*Cleome coluteoides* Boiss.).

Baghdad, *Aucher-Eloy* 418.

This number is cited by Boissier in Diagn. **1,** ser. 1, 3 (1842) as *Cleome coluteoides* Boiss., but in his Flora Orientalis **1,** 416 (1867) the locality for *Aucher* is given as " prope Ispahan ". The specimen at Kew is labelled Baghdad. The flowers and vegetative parts in this species recall those of *Cleome glaucescens*, but the pods are inflated and 20–25 mm. wide. The leaves are glandulose.

Distr. 'Iraq, Persia, Afghan., Transcasp.

Capparis *L.*

A. Sepals subequal . . . . . *C. spinosa* L.

A.[1] Upper sepal larger than the others, cucullate ; leaves thicker *C. cartilaginea* Decne

C. cartilaginea *Decne.* (*C. galeata* Fres.).

Only known from the one specimen in 'Iraq (in the Jazira, *Guest* 3521).

Distr. Egypt, 'Iraq, Arab., Sind, Ethiopia, Sudan, Somaliland.

Capparis spinosa *L.*

The following varieties, as recognized by Boissier p. 420 (1867), are known from 'Iraq, but the varieties seem to merge into each other :

var. **canescens** *Coss.* Not. quel. pl. crit. 28 (1849).

Samara, desert, *Schäfli* 46 ; Karada, 23.6.1920, *Graham* ; Baquba, outside walls of a garden, fls. white, 27.4.1920, *Graham* ; N. of Mosul, Oct. 1929, *Dinsmore* 0417 ; Mesopotamia, common everywhere, *Candler* ; Rustam, May 1929, *Rogers* 0259 ; Basra, Basra liwa, 5 m., common, pickles made from fruit, native name shaffalah, 14.8.1934, *Memarian* 5139 ; Tigris Plain, 700 ft., found as a hedge plant round cultivation, 3.5.1936, *Low* 340 (B.M.) ; Bekhme Gorge, Arbil liwa, 450 m., open limestone rocks, *Quercus* forest formation, petals white, upper parts of filaments purple, frequent, 14.5.1947, *Gillett* 8230 ; 5 km. W. of Diwaniya liwa, c. 40 m., rather saline alluvium with cultivation, locally abundant, petals white, filaments purplish towards tip, shrub 2 m., native name kubar, 2.10.1947, *Gillett* 9948. *Guest* 217, 1596, 3623.

This variety is described by Boissier as ± pubescent, branches less hardened, leaves ovate or elliptic often ending in a small spine, stipules uncinate, flowers fairly large. The specimens above approximate to this description. Var. *canescens* does not seem very clearly marked off from var. *aegyptia* (Lam.) Boiss.

var. **leucophylla** (*DC.*) *Boiss.*

Mesopotamia, *Aucher-Eloy* 409.

Described as with completely adpressed grey hairs, leaves fleshy orbiculate obtuse or retuse with or without a spine, flowers small. The following two numbers agree with var. *leucophylla* except that the flowers are larger (especially in 10846).

Kifri, Kirkuk liwa, 250 m., gypsaceous hills, dry steppe, mountain summit, frequent, petals white, ends of filaments purple, native names kabar (Arabic), margir (Kurdish), 12.4.1947, *Gillett and Rawi* 7410 ; Tell Kotchek to Senonal, Mosul liwa, 400 m., steppe, near channels where rain water collects, deep soil, common, corolla white, filaments purple below, 22.5.1948, *Gillett* 10846.

var. **parviflora** (*Boiss.*) *Boiss.* Fl. Or. **1,** 420 (1867).

In rupestris m. Singarae, May 1867, *Haussknecht* (B.M.).

Described as greyish or velvety, branches thin and hardened, leaves small ovate-oblong rarely orbiculate more often acute spinulose, stipules uncinate often stout [validae], flowers twice or thrice as small as in var. *genuina* Boiss. The specimen below, near var. *parviflora* has small leaves and flower but is neither greyish nor velvety :

Halabja, 600 m., in shady cliff, pure white flowers, tinged with purply pink, edible fruit, Kurdish name mara gira, 20.8.1953, *Guest* 12930.

Cleome *L.*

A. Leaves 3–5-foliolate

B. Pods deflexed

C. Pods 1–1·5 mm. wide . . . . . *C. ornithopodioides* L.

C.[1] Pods c. 4 mm. wide . . . . . *C. arabica* L.

B.[1] Pods erect, c. 4 mm. wide . . . . . *C. viscosa* L.

A.[1] Leaves simple

B. Leaves thick, not cordate at base, glabrous more rarely glandular-scabrid, veins obscure

C. Seeds glabrous . . . . . *C. glaucescens* DC.

C.[1] Seeds hairy

D. Pods 7–12 mm. wide . . . . . *C. kotschyana* Boiss.

D.[1] Pods c. 6 mm. wide

E. Upper part of plant glabrous . . . . . *C. glauca* DC.

E.[1] Upper part of plant glandular-scabrid . *C. stocksiana* Boiss.

B.[1] Leaves thinner, ± cordate or rounded at base, glandular-hirsute, veins prominent and conspicuous below . . *C. quinquenervia* DC.

Cleome arabica *L.*

Babylonia, in incultis inter Baghdad et Babylon, 1.4.1893, *Bornmüller* 28 ; Shabicha, Southern desert, c. 250 m., subdesert, sandy wadi beds, petals white at base, yellow in middle, red at tips, leaves yellowish, strong smelling, locally frequent, 25.2.1947, *Gillett and Rawi* 6261 ; Mahmudiya-Musseiyib, Hilla liwa, 40 m., silt plain with blown sand heaps, *Prosopis-Plantago* etc., petals brownish yellow, tipped with crimson, strong rank smell, not eaten by stock, locally abundant, this species flowers twice, in spring and autumn see 9895 from the same place, its persistence in this area must be due to its unpalatability, native name jawefa, 8.3.1947, *Gillett and Rawi* 6329 ; 43 km. S. of Baghdad on Hilla Road, bare alluvium with blown dust once cultivated, petals yellow tipped with crimson, plant viscid glandular, 1.10.1947, *Gillett* 9895.

This species is figured by Haines in Bull. Inst. Fouad I[er] du Desert **1,** 108, f. 4 : 1951.

Cleome glauca *DC.* e descr.

Boissier p. 414 (1867) cites this species as " in desertis Mesopotamiae (Oliv. et Brug !) ". He distinguishes it from *C. kotschyana* in " folia brevissime petiolata minora 6–8 lineas tantum longa, siliquae sesquipollicares tres lineas tantum latae ". Zohary p. 65 (1950) also records it from the Western Desert, Kirkuk Area, and Jezireh [Jazira] ; his citation " Si (Bo) " presumably refers to Haussknecht's specimen cited by Boissier Fl. Or. Suppl. p. 69 but Ras-el-Ain is in Syria on the River Chabur. This specimen, however, has glandular-scabrid upper parts and does not match De Candolle's original description.

As Burtt and Lewis point out (in Kew Bull. 300 : 1949) these "species" of *Cleome* with simple leaves are very closely related, and the status of some of them is quite uncertain ; *C. glaucescens*, *C. kotschyana*, *C. glauca*, *C. stock-*

siana may be only varieties of one species. The measurement of the pod, given in the key above is taken from Boissier p. 414 (1867).

C. glauca DC. was originally described as having smooth (" levibus ") pods, a description which does not quite apply to any material seen from 'Iraq in which the pods are more or less striate-reticulate. Possibly De Candolle meant glabrous and not glandular-scabrid, rather than smooth in the strict sense of the term. The description begins " herbacea glabra glauca ".

Cleome glaucescens *DC.*

No. loc., rootstock very woody, 1 in. or more in diameter, March 1929, *Rogers* 0283 ; 6 km. above Ana, Duleim liwa, 140 m., dry steppe, frequent, corolla yellowish brown, native name araisha, 26.3.1947, *Gillett and Rawi* 6946 ; south east of Kifri, Kirkuk liwa, 240 m., gypsaceous hills, dry steppe, occasional, 12.4.1947, *Gillett and Rawi* 7417.
Distr. Syria (Post), 'Iraq, Pers.

Cleome kotschyana *Boiss.*

" Assyria " between Besch Abur [Faish Khabur] and Bauerd, 1841, *Kotschy* (provisional lectotype) ; Jabal Makhmur, Arbil liwa, foot of mountain, 300–400 m., steppe on limestone, common, 30.5.1948, *Gillett* 11244.
Distr. N. 'Iraq.

Cleome ornithopodioides *L.*

Penjwin, 1550 m., stony hillside, minute yellow flowers, 20.8.1953, *Guest* 12951.

Also recorded by Nábělek p. 35 (1923) from near Rowanduz and Dohuk and by Zohary p. 65 (1950) from the Amadia Area. The petals in *Guest* 12951 have purplish margins when dried.

Cleome quinquernervia *DC.*

Anthony p. 282 (1935) records this from Mirjani.
Distr. 'Iraq, Pers.

Cleome stocksiana *Boiss.*

Tel Afar, May 1867, *Hauusknecht* ; Qaiyara, Mosul liwa, 640 ft., dry stony hillsides and banks, perennial with 6–12 branches arising from a woody stock, leaves grey glaucous slightly fleshy, peduncles and inflorescence axis viscid, fls. golden brown with darker veins, erect, fragrant, 15.5.1939, *Bayliss* 100 ; Montafa, 10.5.1934, *Field and Yussef Lazar* 96.

Guest 1847, 4381, which I previously named as *C. kotschyana*, should be included here. *C. stocksiana* has already been recorded from Ramadi by Anthony p. 282 (1935). There is considerable variation in flower-size and in the amount of indumentum ; *Field and Yussef Lazar* 96 is glabrous except for the pedicels and uppermost bracts ; Baluchistan : Zahree, *Stocks* (type material) has the pedicels, inflorescence axis, leaves and stem glandular-scabrid.
Distr. 'Iraq, Baluchistan, Afghan.

Cleome viscosa *L.*

In deserto Baghdad, May 1868, *Haussknecht.*

Distr. Cosmop. Trop.

RESEDACEAE

A. Flowers and fruit sessile ; capsule globose lobed 2–3 mm. long ; leaves simple narrow linear . *Oligomeris linifolia* (Vahl.) Macbride

A.[1] Flowers and fruit pedicellate ; leaves often wider., other characters various

B. Capsule with a gynophore longer than persistent calyx ; capsule c. 2 mm. long ; leaves simple linear to oblong-elliptic *Caylusea hexagyna* (Forsk.) M. L. Green

B.[1] Capsule unstalked or if stipitate then gynophore shorter than calyx ; capsule larger ; leaves various . . . . . *Reseda* L.

Caylusea hexagyna (*Forsk.*) *M. L. Green* (*C. canescens* Webb.).

Montafa, 10.5.1934, *Field and Yussef Lazar* 83 ; Rutba, 10–12.5.1934, *do.* 126 ; Shabicha, Southern desert, 250 m., subdesert, young anthers brown, notice long gynophore, native name ethniban, 25.2.1947, *Gillett and Rawi* 6275.

This species is well figured by Haines (in Bull. Inst. Fouad I[er] du Desert **1,** f. 6, 111 : 1951). *C. abyssinica* (Fresen.) Fisch. et Mey. from Abyssinia and Tropical East Africa is very closely related and may not be a distinct species.

Distr. Egypt, Pal., Sinai, Arabia, 'Iraq, N. Afr., Atl. Is. ?, Cape Verde Is.

Oligomeris linifolia (*Vahl.*) *Macbride* (*O. subulata* (Del.) Webb.).

Shaiba, 23.8.1919, *Watson* ; near Baghdad, Mar. 1935, *Yussef Lazar,* 536 ; Baghdad, Faluja desert, several plants in open sandy places, 16.4.1955, *Haines* W154.

Burtt and Lewis discuss the nomenclature of this in Kew Bull. 301 : 1949.

Distr. Egypt, Pal., Syr., Jordan, 'Iraq, Arabia, Afghan., Baluch., Punjab., Atl. Is., N. Africa, Central Sahara, Sudan.

Reseda *L.*

A. Capsule 4-dentate

B. Leaves pinnatisect, lower leaves with 5 or more segments on each side ; petals white

C. Disc and claw of petals (often only slightly) developed *R. kurdica* Boiss. et Noë.

C.[1] Disc (almost or entirely) and claw of petals absent *R. decursiva* Forsk.

B.[1] Leaves simple ; petals yellow . . . . . *R. luteola* L.

A.[1] Capsule 3-dentate

D. Sepals persistent ; capsules erect or pendulous

E. Capsule pendulous ; seeds various

F. Capsule oblong ; seeds smooth ; calyx not accrescent ; leaves ternate or ternately divided . . . *R. lutea* L. var. *nutans*

F.[1] Capsule subglobose ; seeds wrinkled tuberculate ; lower leaves ternate or simple, upper leaves simple

G. Ovary sessile, calyx accrescent . . . *R. arabica* Boiss.

G.[1] Ovary stipitate, calyx not accrescent . . *R. odorata* L.

E.[1] Capsule erect ; seeds smooth

H. Capsule ± oblong rarely subglobose, 4–18 mm. long ; peduncles 3–6 mm. long ; other characters as in F. above *R. lutea* L.

[H.[1] Capsule subglobose, 3–9 mm. long ; peduncles up to 3 mm. long ; leaves ternate or ternately divided ; plant more scabrid . . . . . *R. muricata* Presl.]

D.[1] Sepals deciduous ; capsules erect

[J. Capsule cylindric-clavate ; seed smooth ; plant scabrid *R. pruinosa* Del.]

J.[1] Capsule subglobose ; other characters various

K. Seed smooth ; plant not or somewhat scabrid ; leaves simple or ternate, leaf-segments orbicular to linear

L. Filaments deciduous

M. Leaves simple up to 4 mm. wide, leaf-segments narrow-lanceolate to linear . . *R. haussknechtii* Mill.-Arg.

M.[1] Leaves simple or divided, leaf segments wider *R. bracteata* Boiss.

L.[1] Filaments persistent . . . . . *R. aucheri* Boiss.

[K.[1] Seed wrinkled tuberculate ; plant scabrid ; leaves ternate or ternately divided, leaf-segments linear-lanceolate or lanceolate *R. muricata* Presl.]

There is a monograph of the Resedaceae by Bolle in Pflanzenfam. **17B,** 657–692 (1936).

Reseda arabica *Boiss.*

Jabal Samara [Jabal Sanam ?], 23.8.1919, *Watson* ; 10 km. south of Zubair, Basra liwa, 30 m., sandy-gravelly subdesert, petals pale yellow, anthers darker, 17.2.1949, *Gillett and Rawi* 6100.

No fruit, but appear to be this species.

Distr. Egypt, Sinai, Arabia, S. 'Iraq, N. Afr.

Reseda haussknechtii *Mill.-Arg.* in DC. Prod. **16,** II, 574 (1868).

In deserto Singarae, May 1867, *Haussknecht* (B.M., type material); Jabal Golat between Ain Tellawi and Balad Sinjar, 26.5.1934, *Field and Yussef Lazar* 438; 26 km. east of Balad Sinjar, Mosul liwa, 500 m., steppe, loose dusty soil, locally common, yellow, 27.5.1948, *Gillett* 11160.

Haussknecht's specimen shows leaves up to 4 cm. long and c. 3 mm. wide, the uppermost leaves about 1 mm. wide. *Gillett* 11160 is a good match for Haussknecht's specimen. *Field and Yussef Lazar* 438 has somewhat shorter and wider leaves and connects this species with the narrower leaved specimens of *R. bracteata*. The character of the persistent filaments used to separate *R. aucheri* and *R. bracteata* is far from clear. *R. aucheri* Boiss. Diagn. Ser. **I,** No. 1, 5 (1842), *R. bracteata* Boiss. Diagn. Ser. **I,** No. 6, 22 (1845) and *R. haussknechtii* may not be distinct species or may hybridize, but further observations are necessary to settle this point.

Reseda kurdica *Boiss. et Noë* e descr.

Boissier cites this from " in subalpinibus Kurdistaniae Persicae prope Mendeli (Noë) ". The locality is presumably Mandali, now in 'Iraq. Boissier compares it to *R. alba* L. from which it differs in subsessile flowers, and quinquefid upper petals, and to *R. decursiva* Forsk. from which it is distinguished by the petals twice as long (not subequal trifid). The characters given in the key above are taken from Bolle.

R. decursiva Forsk. is figured by Haines (in Bull. Inst. Fouad, I[er] du Desert **1,** f. 7 : 1951).

Reseda lutea *L.*

" Pl. Mespot., Kurdistan & Mossul ", 1841, *Kotschy* 96; Zawita, 3400 ft., on rocky cliff near village, 30.7.1933, *Guest* 4841; no loc., 30.5.1934, *H. Field and Yussef Lazar* 529; Mosul, 800 ft., fields, 18.3.1947, *Leatherdale* 16 (B.M.); Arbil, 400 m., cereal fields in moist type steppe, frequent, yellow, jabora (Kurdish) but this is also used for other plants e.g. *Marrubium*, 7.5.1947, *Gillett* 8000; Dohuk, Mosul liwa, 2000 ft., under shelter of limestone rock above ravine, whitish green flowers, 1.5.1951, *Mooney* 4320.

Gillett 8000 shows oblong and globose capsules on the same shoot, and connects *Guest* 4841 with the normal form of *R. lutea*. *Mooney* 4320 is only doubtfully included in this species, as it bears no fruit and the flower colour is not that usual in *R. lutea*.

Reseda lutea *L.* var. **nutans** *Boiss.* Fl. Or. **1,** 430 (1867).

No loc., 30.5.1934, *H. Field and Yussef Lazar* 529.

This variety differs from the typical only in " capsula subnutans vel pendula ".

Reseda luteola *L.*

Pl. Mesopot., Kurdistan & Mossul, 1841, *Kotschy* 292; near Jabal, Bekheir, Mosul liwa, yellow, 7.5.1947, *Rawi* 8529A.

Distr. Eur., Or., N. Afr., Atl. Is.

Reseda muricata *Presl* ? or **pruinosa** Del. ?

Shabicha, Southern desert, c. 250 m., subdesert, sandy stony slopes, occasional, anthers brownish, petals inconspicuous, 25.2.1947, *Gillett and Rawi* 6257.

In the absence of fruit, these specimens cannot be more accurately named.

Distr. (of *R. muricata*). Sinai, Palestine, Arab., (also Egypt, f. Bolle). (of *R. pruinosa*) Egypt, Sinai, Pal. (also Arab., Abyssinia, f. Bolle).

Cistaceae

A. Outer stamens sterile ; subshrubby perennial . . *Fumana* Spach

A.¹ Stamens all fertile ; annual or perennial . *Helianthemumum* Mill.

Helianthemum *Mill.* and **Fumana** *Spach.*

A. Perennial, subshrubby ; style bent at base

B. Peduncles longer than calyx, spreading . *Fumana arabica* (L.) Spach

B.¹ Flowers sessile or subsessile . . . . *H. lippii* (L.) Dum.-Cours.

A.¹ Annual ; style short straight

C. Fruit deflexed, peduncles thin (under 0·5 mm. wide) ; inner sepals membranous glabrous except for stiff hairs on brown nerves *Helianthemum aegyptiacum* (L.) Mill.

C.¹ Fruit erect, peduncles thick (0·5–1 mm. thick) ; inner sepals stiff less membranous pubescent on and between nerves

D. Peduncles spreading curved upwards c. 0·5 mm. thick, longer than calyx . . . . . *H. salicifolium* (L.) Mill.

D.¹ Peduncles erect-spreading straight c. 1 mm. thick, shorter than calyx

E. Capsules glabrous except on margins of valves *H. ledifolium* (L.) Mill.)

E.¹ Capsule pubescent . *H. ledifolium* var. *lasiocarpum* (Desf.) Boiss.

Violaceae

Viola *L.*

A. Perennial

B. No stolons, thick erect rootstock ; leaves entire, lamina up to 17 mm. long tapering into petiole ; sepals 2–3 mm. long *V. pachyrrhiza* Boiss.

B.¹ Stolons present ; leaves crenate, larger, cordate at base ; sepals 5–8 mm. long

C. Leaves wide cordate ; flowers darker violet . . *V. odorata* L.

C.¹ Leaves triangular ; flowers white or pale violet . *V. alba* Bess.

A! Annual

D. Pedicels with two small bracteoles . . *V. kitaibeliana* R. et S.

D! Pedicels without bracteoles . . . . . *V. modesta* Fenzl.

Viola alba *Bess.*

Distr. S. and Centr. Eur., Cauc., Cyprus, Asia Minor, Pal., Syria, 'Iraq, Algeria, N. Asia.

There is a specimen of a *Viola* at Kew (Baghdad district, *Rogers* 5274) but this sheet probably has a misplaced label which should belong to some other specimen.

[**Viola kitaibeliana** *R. et S.* (*V. parvula* Tineo).

Expedition to the Euphrates, *Chesney* 164.

This is described by Boissier as a variety of *V. tricolor* as " cinerascenti-velutina graciles, flores minuti pallidi, stipulae lacinia intermedia folio saepe similis". Zohary p. 107 (1950) lists *V. tricolor* on the strength of Boissier's citation of the above specimen. The petals shorter than the calyx distinguish this from *V. tricolor* L. The locality is possibly in Syria or Turkey rather than 'Iraq.].

Viola modesta *Fenzl* (*V. ebracteolata* Fenzl).

Zakho, 1200 ft., river bank (sandy), 16.3.1947, *Leatherdale* 15 ; Derbend-i-Basian (also Pir Omar Gudrun), 1200 m., limestone mountain with coppiced *Quercus aegilops* forest, in shade of rocks, occasional, pale blue above, yellow in the throat, 15.4.1947, *Gillett and Rawi* 7641 ; Salahaddin, Arbil liwa, 1000 m., locally abundant, corolla white with yellow centre and black dots, spur violet, 24.3.1948, *Gillett and Rawi* 10420 ; Gweija Dagh forestry enclosure, Sulaimaniya liwa, 1100 m., limestone, denuded of *Quercus* forest, cream or bluish, yellow in the centre, *Gillett and Rawi* 10632 ; Jabal Sinjar above Kursi, Mosul liwa, c. 900 m., limestone mountain with relics of *Quercus aegilops* forest and terraced fig gardens, cream to pale blue with yellow patch in throat, 24.5.1948, *Gillett* 11025 ; near Chaluki, Mosul liwa, in open woodland (*Quercus libani*, *Q. aegilops*, *Q. infectoria*, *Juniperus oxycedrus* and *Pyrus* sp.), on calcareous clay over limestone, 4350 ft., *Mooney* 4301.

Viola pachyrrhiza *Boiss. et Hoh.*

In cacumine m. Gara (Kurdist.) fissuris rupium calcareum septentrionem versus sitarum infixa, 27.7.1843, *Kotschy* 342 (type material) ; Gara Dagh, Mosul liwa, 1900 m., limestone mountain, note this differs from the description in having hairs on the pedicels, the petals seem glabrous within, the pedicels are longer than described, 22.6.1947, *Rawi* 9280.

Polygalaceae

Polygala *L.*

A. Annual ; stems erect ; upper leaves lanceolate very acute ; sepals acute-obtuse at apex, veins less branched, not anastomosing *P. monspeliaca* L.

A! Perennial, ± woody at base ; stems prostrate ; upper leaves elliptic-ovate obtuse or rounded (rarely subacute) ; sepals obtuse or rounded at apex, veins more branched and anastomosing . *P. supina* Schreb.

Polygala monspeliaca *L.*

Inter Erbil [Arbil] et Altum Kopru, May 1867, *Haussknecht* ; in uligin. sals. inter Tell Afar et Singara, May 1867, *do.* ; Bekhme gorge, Arbil liwa, 500 m., steep limestone slopes, *Quercus aegilops–Q. infectoria* forest,damp spots, cream striped with green, local, 14.5.1947, *Gillett* 8250.

Polygala supina *Schreb.*

Kurdish hills, 2500 ft., found in crevice in rock, flowers pinky-mauve with hairy lip, 26.5.1936, *Low* 323 (B.M.).

Distr. Balkan Pen., As. Min., Syria (Pal. f. Post).

FRANKENIACEAE

Frankenia *L.*

A. Annual, prostrate, stem glabrescent or slightly hairy ; leaves flat or margins only revolute ; petals c. 1 mm. longer than calyx *F. pulverulenta* L.

A! Perennial, erect, stem ± densely pilose ; leaves revolute ; petals 2–3 mm. longer than calyx . . . . *F. aucheri* Jaub. et Spach

Frankenia aucheri *Jaub. et Spach* (*Frankenia hirsuta* L. var. *erecta* Boiss.).

13 km. S.W. of Wadi Thirthar on pipeline, Duleim liwa, 190 m., dry steppe saline soil, dominant, camels and sheep are only able to eat this when they can get fresh grass at the same time, pink, native name milleh (meaning "salt"), 31.3.1947, *Gillett and Rawi* 7122 ; Qsaiah near Rawa, Duleim liwa, 150 m., dry steppe, occasional, pink, 7.9.1947, *Rawi* 9918.

Frankenia pulverulenta *L.*

In deserto salso Singarae, May 1867, *Haussknecht* (B.M.) ; in salsis pr. Baghdad, *do.* (B.M.) ; Mesopotamia, *Watson* ; Shargat, Apr. 1920, *Thomas* (comm. *Graham*) ; Rustam Farm, near Baghdad, 25.4.1933, *Yussef Lazar* 191 ; Chehala, near Amara, 26.5.1934, *Field and Yussef Lazar* 44 ; near Baghdad, Mar. 1935, *Yussef Lazar* 550 ; Sakhlawizal Canal, W. of Baghdad, on salty soil, Sept. 1929, *Guest* ; Shbaichan near Ana, Duleim liwa, 6.4.1946, *Rawi* 5791 ; 50 km. N.E. of K3 on Pipeline, 200 m., dry steppe, salty wadi, pink, 30.3.1947, *Gillett and Rawi* 7118.

Additions and corrections

It should be noted that in Mr. E. R. Guest's contribution in the General and Ecological Account and on Economics as well as in their Bibliography in Kew Bull. no. 3, 1953 ; no. 4, 1953 and no. 2, 1954 (parts VI, VII and VIII of " The Rustam Herbarium ") were prepared as long ago as 1934, and a few anachronisms, such as Transjordania for the Kingdom of Jordan and a reference to the recent pacification of the Kurdish tribes were unfortunately not corrected.

In " The Rustam Herbarium, 'Iraq " :—

Part I.

p. 419. Line 29 delete " Rustam, Oct. 29, 314 "

Line 30 delete " 1559 "

p. 418. Lines 18–19 " **Ononis reclinata** . . . . 3384 " should be transferred to the preceding page

Lines 31–34 " **O. spinosa** . . . . . 4997 " should be under **Ononis** and transferred to the preceding page.

Part III

p. 524. Lines 39 and 44 " **L. callosum** Vahl " and " **L. tenuiflorum** L. fil " should read " **Lithospermum callosum** Vahl " and **Lithospermum tenuiflorum** L. fil "

p. 530. Lines 29–37 " **Onosma froedenii** . . . . *O. froedenii* " should be transferred to page 526 after **O. dichroanthum** Boiss.

In " Notes on the Flora of 'Iraq with Keys " part I :—

p. 477. Line 17 for " cm. " read " mm. ".

p. 480. Line 11 for " *C. cuneatus* " read " *R. cuneatus* "

p. 482. **R. polyrrhizus** Steph. should be disregarded as an 'Iraqi plant. Olguin's " Kurdistan " is in Persia (see Olguin's letter to Kew 7 Aug. 1854)

p. 487. Lines 5 and 6 should read :—

" H. Capsule elliptic-oblong, 1–1·5 cm. long
P. macrostomum Boiss. et Huet

HH. Capsule oblong-tubular, 2–2·5 cm. long
P. tubuliferum Fedde

p. 492. Line 36 for " Zuhair " read " Zubair ".

Ornamental Trees of India.*—This new edition of Blatter and Millard's " Some Beautiful Indian Trees ", which originally appeared in 1937, has been thoroughly revised by Mr. W. T. Stearn. The general plan of the book has been retained and consists of a series of articles, arranged alphabetically according to genera, which originally appeared in the *Journal of the Bombay Natural History Society*. About 50 trees (some of them introduced in the Indian subcontinent) belonging to 29 genera are dealt with. Full notes on the derivation of the Latin names and history of the plants are provided as well as popular descriptions and notes on distribution, cultivation, uses and vernacular names.

The nomenclature of all the species has been brought up to date. An important addition which Mr. Stearn has introduced is the reference to the original place of publication of each species together with its synonymy. This will be especially useful to botanists who are dealing with any of these species of ornamental flowering trees, a number of which are widely cultivated in other tropical regions. Among the changes in nomenclature in this edition is the transference of the Indian species of *Bombax* to *Salmalia* in accordance with the restriction by some authorities of the name *Bombax* to American species.

Additional material is incorporated in appendices, which include descriptions of the 15 families represented and a botanical glossary (which includes " genus " but carefully avoids " species "). There is also a key to the genera represented in the book—a qualification which makes the usefulness of the key rather limited.

The many illustrations of the first edition are reproduced again. The colours in the coloured plates frequently differ considerably between the two editions. Indication of the scale on the coloured plates is omitted in the new edition. The book, which is printed in Great Britain, is well produced.

L. L. FORMAN.

* Some Beautiful Indian Trees, by E. Blatter and W. S. Millard, second edition revised by W. T. Stearn. Pp. xvi + 165. Coloured plates 32 ; black and white plates 47 and figs. in text. Bombay Natural History Society, Bombay, India ; 1954. Price Rs. 20 or 30/-.

Grapes under Glass.*—This little handbook is a concise guide to the basic principles of vinery management. The author, who is head gardener to Her Majesty the Queen at Sandringham, is obviously an enthusiastic grape grower who favours traditional methods. His practical experience is in evidence throughout the book. One cannot expect a comprehensive account in the seven brief chapters on history ; propagation ; the vinery ; planting ; training and pruning ; general vinery management ; diseases and pests ; and a list of selected varieties. The author has done well to compress so much information into so small a space, without a lapse into telegraphic style. It is a pity that a bibliography has not been included for the benefit of those who would like to seek further information.

S. G. HARRISON.

* Grapes under glass, by H. Parsons, N.D.H. Pp. 62. London, W. H. & L. Collingridge Ltd., 1955. Price 10/6d. net.

TWO SPECIES OF HELOTIACEAE WITH GELATINISED SURFACE TISSUES.

R. W. G. Dennis

When von Höhnel (1918) revised the european fungi referred by previous authors to *Ombrophila* Fr. he retained within the genus only species in which the apothecium was partly composed of gelatinous tissue. In the type species, *O. violacea* Fr., this tissue forms the core of the apothecium, composed of irregularly arranged hyphae, with lumen 4–5μ wide, lying in a soft, hyaline, greatly swollen matrix formed by gelatinisation of the outer portion of the hyphal walls. The surface tissue of the cup is made up of parallel, thinwalled, non-gelatinised hyphae 10–15μ wide but on the short stalk this, in turn, is covered by a zone of hyphae with thickened subgelatinised walls.

Von Höhnel also retained in *Ombrophila* a small number of species with very different structure in which the core of the apothecium is non-gelatinous but is coated by a highly gelatinised sheath containing very slender sparsely distributed hyphae. To this group belonged *Ombrophila morthieriana* Rehm, on fallen needles of *Larix*, and *O. umbonata* (Pers.) Karsten sensu Karsten non Rehm, on withering leaves and plant debris.

Recent collections received at Kew have made it possible to study two species of the second group in the fresh condition and it is suggested that they may conveniently be transferred from *Ombrophila* to a new genus of Helotiaceae :

Pseudodiscinella Dennis gen. nov. Apothecia sessilia, pallida, glabra vel margine dentibus setaceis coronata, carne molli, parenchymatico, excipulo gelatinoso. Asci cylindraceo-clavati, octospori. Ascosporae ellipsoideae, hyalinae, simplices. Paraphyses filiformes.

Type species = *Peziza ciliifera* Karst.

Pseudodiscinella ciliifera (Karst.) Dennis, comb. nov.

Peziza ciliifera Karst. in Not. Sallsk. Fauna Flora Fennica **10,** 153 (1869).

Ombrophila ciliifera (Karst.) Karst. in Mycologia Fennica **1,** 91 (1871).

Helotium ciliiferum (Karst.) Karst. in Not. Sallsk. Fauna Flora fennica **11,** 237 (1871).

Hyaloscypha ciliifera (Karst.) Boud., Hymenomycètes d'Europe 127 (1907).

Apothecia gregarious, sessile, externally smooth, shallow cupshaped, hyaline-white throughout, disc flat, up to 4 mm. across, with a thin, erect, translucent rim from which arise narrow pointed teeth about 400μ long. Flesh composed throughout of large, thin-walled, elliptical cells, smaller towards the surface ; sheathing layer about 30μ thick, composed of slender hyphae about 2μ wide permeating a colourless gelatinous matrix. This sheathing layer is prolonged to form the translucent rim and from it arise the marginal teeth which consist of similar slender hyphae lying parallel and cohering closely without a gelatinous matrix. Asci cylindric-clavate, up to 115 × 8μ, 8-spored, the apex rounded with

a thick hyaline cap which does not stain in Melzer's reagent ; ascospores uniseriate or exceptionally biseriate above, elliptic-fusiform or slightly clavate, hyaline, nonseptate, 10–15 × 3·5–4·5μ ; paraphyses numerous, simple, cylindrical, very slender, 1μ thick.

Amongst fallen pine needle and other dèbris under *Carex rostrata* in pine woods, Lock Garten, Aviemore, Invernesshire.—*D. A. Reid* 4.9.1955.

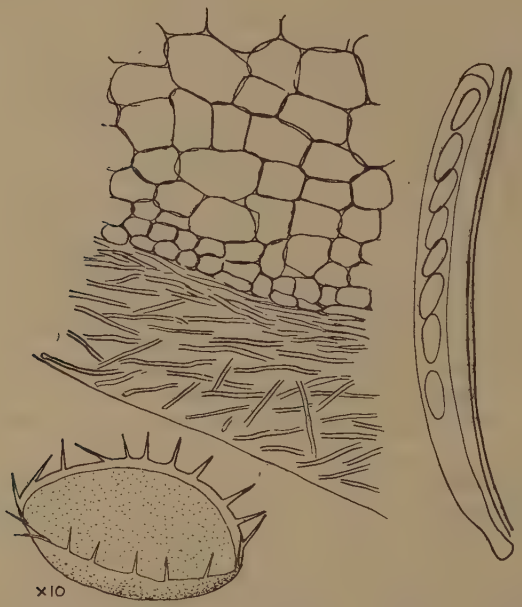

Fig. 1. *Pseudodiscinella ciliifera.* Habit sketch × 10, section of excipulum, ascus and paraphysis × 660.

The Kew example of Karsten's Fungi Fennici 546, issued as *Peziza ciliifera*, is in rather poor condition and does not clearly show the marginal teeth. Fortunately Karsten described these fully in his diagnosis : " Pili seu setae cupulae basi incrassati, fibrosi, absque ullis articulis, longit. 0·2–0·4 mm. crassit (basi) 0·1–0·15 mm." The exsiccatum does, however, clearly show the large-celled pseudoparenchymatous flesh and sheathing gelatinous layer which were not mentioned in the diagnosis. The type locality was evidently similar to that of the Scottish collection : " Supra folia putrida et ad terram in uliginosis udis silvarum Coniferarum in Fennia . . . . mensibus Julio-Septembri," and there can be little doubt Mr. Reid's material represents Karsten's fungus.

It was no doubt on account of the reference to marginal hairs that Boudier referred *P. ciliifera* to *Hyaloscypha*. In fact it has little in common with that or any other genus of the Hyaloscyphaceae. It may be regarded rather as a *Discinella* in which the outermost tissue has become gelatinised. This is borne out by the occurrence of similar though shorter and more delicate teeth in young material of *D. margarita* Buckley

kindly sent me by Mr. W. D. Graddon in May 1953. In spite of their conspicuous appearance it is doubtful if the marginal teeth offer a good generic character. A tendency to develop a laciniate margin occurs in several other genera of Helotiales, *Habrostictis*, *Hyalinia*, in addition to the well-known example of *Cyathicula*, and even in Pezizales such as *Lamprospora*. If the marginal teeth are not taken as an essential generic character then *Peziza obstricta* Karst. and presumably also *Ombrophila morthierana* Rehm should also be transferred to *Pseudodiscinella*.

Pseudodiscinella obstricta (*Karst.*) *Dennis*,* also a plant of decaying plant remains in wet situations, is well characterised by the remarkable spiral hyphae found in its gelatinous sheath.

von Höhnel, F. (1918) in Sitz. Kaiserl. Akad. Wissensch. Wien Mathnaturw. Klasse Abt. 1, 127 (4/5) pp. 350–363.

* *Peziza obstricta* Karst. in Not. Sallsk. Fauna Flora fennica, **10,** 151 (1869).

A Manual for Cacao-planters.*—After a long period of comparative neglect, the cacao-bean has become a sought-after commodity, and the plant from which it comes has begun to receive every attention. Almost annually since the war, a conference has been held in London to discuss its well-being, and large sums have been spent on research into its requirements. As a result, fresh knowledge of cacao is being gained, and a new book about it can hardly fail to attract notice and a welcome.

The author, an agriculturist with many years' experience in the Colonial Service, has set out to provide a handbook on cacao for planters, and he has called in the aid of others to deal with special aspects. A lucid chapter on the Botany of Cacao by the late R. E. D. Baker is a fresh reminder, if that be needed, of the great loss cacao research and tropical botany have sustained in his untimely death. Prof. Hardy on Cacao Soils stresses the importance of maintaining the fertility and structure of the forest-soil required by cacao, a lesson yet to be learnt in West Africa where, in the reviewer's opinion, the steady impoverishment of soil in many cacao farms constitutes the greatest menace to the future of the industry. Prof. Shephard contributes a short chapter on the Rehabilitation of Trinidad Plantations, and A. F. Posnette so attractive an account of the virus diseases of cacao that one is tempted to forget what a devastating and frustrating scourge they are.

The main part of the book however is Mr. Urquhart's and deals in turn with the choice and preparation of suitable land, the planting and cultivation of the crop, its harvesting, fermenting, and drying. This practical account is effectively written and is illustrated by many excellent photographs which form an attractive feature of the book. One which shows how cacao may be fermented on the ground will not be popular in Nigeria, where for some years official action has been taken against this practice in favour of fermentation in baskets or boxes.

* Cocoa. By D. H. Urquhart, B.Sc. (Agric.). Longmans, Green & Co. 1955, pp. 230 with 97 plates. Price 35/-.

It is commonly said that no two people who have grown cacao agree on how it can best be done, and the reviewer may accordingly be expected to disagree with the author in some matters. One is the stress which the author places on the propagation of cacao by cuttings. Plantations in Trinidad have used clonal cacao but it has yet to be shown that the planting of clones is either practicable or desirable throughout the cacao-growing countries. Much can be said in favour of selected seed of good parentage, and planting from seed is the method likely to be generally followed for some time. In describing the pests and diseases which assail cacao in the different continents the author has found so many to mention that treatment of most is necessarily sketchy. A more concentrated attack confined to the deadlier might have proved more effective. A chapter on Research gives due credit to the cacao research stations in Trinidad and West Africa, but makes surprisingly slight reference to the immense efforts made since the war by the Governments of the Gold Coast and Nigeria (work in which the author took a prominent part) to place their industry on a sound basis, by surveys made to determine the position, size, and age of all plantings of cacao and their condition with respect to disease, by campaigns to effect control of disease and improvement in quality, and by soil surveys, of which that in Nigeria aims at finding the position and extent of all land suited to cacao.

The more general chapters on the development and extent of world production are less successful than the chapters on cultivation and include statements lacking in precision. As an example, the author's assertion that the Gold Coast produces 230,000 tons and Brazil, Nigeria, and French West Africa each " 50,000 tons or more " hardly fits the actual figures given in an accompanying table (in thousand tons) of 228, 125, 97 and 78 respectively. If memory serves, the standards of quality which the author quotes for the grades of cacao exported from Nigeria were altered in 1951.

Although points such as these may rouse the worse instincts of a reviewer, they do little to prevent the book from being, as its author and publishers intended, a useful and attractively produced handbook for the cacao-farmer. Aided by its full index and clear headings, the planter will have little difficulty in finding good practical guidance.

T. A. Russell.

Rusts of British Forest Trees.*—This handy little booklet gives a popular account of the rust fungi known to cause diseases of British forest trees. The symptoms of the more important diseases are illustrated by excellent photographs. Nine of these have been reproduced in colour but so crudely that the extra expense involved seems hard to justify. The text is readable and accurate.

R. W. G. Dennis.

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* Rusts of British Forest Trees. Forestry Commission Booklet No. 4. By J. S. Murray, pp. 15. H.M. Stationery Office, London, 1955. 2/6d.

A NOTE ON THE SPINY-SPORED SPECIES OF LAMPROSPORA.

R. W. G. Dennis

Wherever among the Pezizales one finds species with globose spiny ascospores there appears to be a tendency for the development of variants or subspecies differing mainly in the character of the spines. Often there is also a parallel species with smooth ascospores of similar shape and size. Thus, in *Plicaria* we have the series :

P. leiocarpa (Curr.) Boud. with smooth spores

P. trachycarpa (Curr.) Boud. with finely warted spores

P. trachycarpa var. *muricata* Grelet with spiny spores

In *Barlaeina* is the pair of species :

B. persoonii (Crouan) Sacc. & Trav. with smooth spores

B. amethystina (Quél.) Sacc. with warted spores

In *Scutellinia* we have :

S. trechispora (Berk. & Br.) Lambotte with warted spores

S. asperior (*Nyl.*) comb. nov. [=*Peziza asperior* Nyl. in Not. Sallsk. Faun. Flor. Fenn. **10,** 21 (1869)] with spiny spores.

In *Lamprospora* there seems to be a more extensive series, comparable to the species-complex having spores with reticulated ornament in the same genus. Four apparently distinct taxa differentiated by ascospore characters are illustrated in Figure I.

Fig. 1A shows ascospores of a collection distributed by Karsten as his *Peziza modesta*, i.e. *Lamprospora modesta* (Karst.) Boud. In this plant the ascospores, not always perfectly globose, measure 16–19μ diameter, with low pointed warts about 1μ high. This collection is dated Mustiala, May 1878, whereas the type collection was from bare garden soil, Mustiala, 2nd Oct. 1865, but it was apparently this low-warted type of spore that Karsten indicated in his diagnosis, " Sporae primitus laeves diam. 16-18, tandem aculeatae, diam. 18–20 mmm." If the second measurement indicates an over-all diameter it relates to a spine 1μ high on each side of the ascospore, as in those figured. The lowest spore in Fig. 1A is from a British collection, on the vertical side of a cow's hoofprint in wet soil of canal towpath, Congleton, Cheshire, W.D. Graddon 658.

Fig. 1B illustrates the ascospores of Boudier's concept of *Lamprospora crec'hqueraultii* (Crouan) Boud., a concept which Madame Le Gal has checked against the type in the Crouans' herbarium and found correct. Here the spores are similar in shape and size to those of *L. modesta*, 15–20μ across, but with longer slender spines up to 3μ in length.

Lamprospora crec'hqueraultii var. *macrantha* Boud., illustrated in Fig. 1C, differs in its larger ascospores, 18–25μ across, with much coarser spines 6μ long. All these taxa have yellow to yellowish-orange saucer-shaped apothecia, broader than they are high at maturity, and occur on bare soil.

Fig. 1D is taken from a collection made by Mr. E. A. Ellis on rotting *Carex riparia* at Wheatfen, Norfolk, 3rd Nov. 1946. This has still larger

ascospores, 25–28μ diameter, ornamented with numerous, slender, pointed, often slightly curved spines about 6μ long. It may be differentiated as follows :

Lamprospora crec'hqueraultii (Crouan) Boud. var. *paludosa* var. nov.

A var. *macrantha* apotheciis minoribus, pallidioribus, sporis majoribus differt.

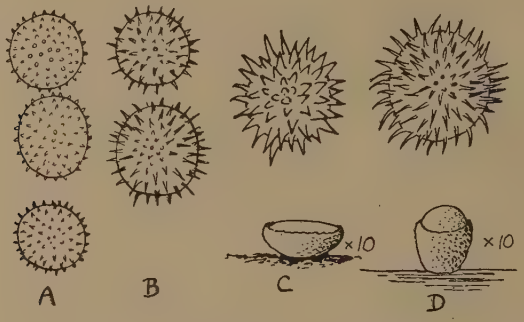

Fig. 1. Ascospores of Lamprospora × 660 for explanation see text.

Apothecia whitish, drying pale ochraceous, at first globose, sessile on a broad base, then obconical, about 1 mm. tall and 0·5–0·75 mm. wide, with a markedly convex disc ; outer surface papillate with protruding subglobose excipular cells. Asci operculate, the apex not blued by Melzer's reagent, 340 or more by 40μ, 8-spored ; ascospores uniseriate, hyaline, globose, 25–28μ diameter, occasionally up to 35μ, ornamented with numerous slender, pointed, often curved spines up to 6μ long ; paraphyses septate, 7–8μ wide, swollen towards the obtuse tip to about 13μ, colourless.

This differs from the other varieties of *L. crec'hqueraultii* in its tall narrow apothecia and pale colour as well as in growing on rotting vegetation instead of directly upon bare soil. It might therefore be allotted specific rank but it is not impossible that all these apothecial characters may depend in part on environmental factors. It will be noted that in the series of taxa listed above authors have not been consistent in assigning varietal or specific rank to organisms differing from one another in comparable degree. The writer feels that, until something is known about the genetical constitution and capacity for variation in *Lamprospora*, taxa so obviously closely related as the four figured are best treated as varieties of a single species.

INDIGOFERA

New species, varieties and names from West Tropical Africa.

J. B. Gillett

In preparing accounts of the genus *Indigofera* for the Flora of Tropical East Africa, the second edition of the Flora of West Tropical Africa and the proposed Flora Zambesiaca, it has been found necessary to revise the genus, as it is found in Tropical Africa, fairly thoroughly. It is now clear that this revision cannot be published before the next part of F.W.T.A. ed. 2 appears and those portions of it necessary to validate new names appearing in that work are accordingly given below. Specimens cited are at Kew unless otherwise stated and have been seen unless enclosed in brackets. My thanks are due to the authorities in charge of the other herbaria for their courtesy in loaning specimens for study.

In the descriptions of new taxa information enclosed in square brackets has been derived from specimens other than the type.

The abbreviations F.T.A., F.W.T.A., F.C.B., and L.T.A. for certain standard works are as used in the floras mentioned above.

I. charleriana *Schinz* var. **sessilis** (*Chiov.*) *Gillett* stat. nov.

I. linearis DC var. *sessilis* Chiov. Fl. Somala **2,** 160 (1932).

I. relaxata N. E. Br. Kew Bull. **1925,** 148.

" *I. aspera Perr. ex DC* " sensu Chevalier Expl. Bot. Afr. Occ. Fr. 172 ; F.W.T.A. ed. 1, **1,** 392 ; Tisserant Bull. Mus. Hist. Nat. Par. 2nd ser. **3,** 272 pro parte, non Perr. ex DC.

Dahomey coast *Chevalier* 22718 ; Somalia Transjuba Coast *Senni* 387 Fl, 470 Fl, syntypes ; Kenya coast *Tweedie* 950, *Bogdan* 2524, *Whyte* (1902) s.n. K, BM ; Zanzibar *Vaughan* 1303 ; Port E. Afr. Delagoa bay *Schlechter* 11968, *Scott* s.n. *Gomes e Souza* 3670 ; Angola coast *Welwitsch* 2036 BM ; Transvaal *Leendertz* 2094 holotype of *I. relaxata.*

I. berhautiana *Gillett* nom. nov.

I. sericea Benth. ex Bak. F.T.A. **2,** 76 (1871) pro maj. parte, quoad pl. guineenses ; L.T.A. no. 62 pp. ; non *I. sericea* L. (1771).

" *I. aff. strobilifera Hochst.*" sensu Chevalier Expl. Bot. Afr. Occ. Fr. 177.

As Baker's description of *I. sericea* is mixed, being drawn in part from *Chapman and Baines* s.n. from S.W. Africa, which is *I. arenophila*, the species is redescribed below.

Species propter floribus solitariis in axillis bractearum foliacearum ab congeneribus late stipulaceis omnibus distincta ; *I. taborensi* sola excepta. Ab ea foliis inferioribus 3–5-foliolatis, rhachide longa, ab bracteis facile distinctis, differt.

Herba ± suffruticosa, ramis patentibus cylindricis sericeo pilosis ad 40 cm. longis. *Folia* 3–5-foliolata [in regionibus orientalibus forsan semper 3-foliolata] ubique sericeo pilosa, ad paginam superiorem pilis rigidis medifixis appressis etiam obsita ; stipulae basin unilateraliter late cordatae, apice acuminatae, ad 9 mm. longae, 5 mm. latae ; rhachis 5–14 mm. longa, petiolo 3–4 mm. longo incluso, ultra foliola lateralia opposita 2–4 mm. prolongata ; foliola oblanceolata, terminale quam

lateralia paulo majus, ad 13 mm. longum, 6 mm. latum. *Panicula* ramosa, laxa, foliosa, ubique sericeo pilosa, bracteis 3-foliolatis, foliolis lateralibus saepius ad fila reductis, vel rarius uno vel ambobus absentibus, stipulis, quam lamina saepe majoribus, basin c. 0·5 mm. connatis. *Flores* in axillis bractearum semper solitarii, pedicello c. 1 mm. longo. *Calyx* pilis c. 1·5 mm. longis sericeo pilosis, c. 3 mm. longus, tubo c. 0·5 mm. longo incluso, lobis angustissime lanceolatis subaequalibus. *Vexillum* extus pubescens. *Alae* glabrae. *Carina* ad marginem pubescens, haud rostrata, vix calcarata. *Stamina* omnia fertilia, filamentis c. 4 mm. longis, antheris ellipticis basin muticis c. 0·6 mm. longis, mucrone apicale fusco 0·15 mm. longo incluso. *Ovarium* c. 1 mm. longum, 3-ovulatum, sericeum, stylo c. 3·5 mm. longo basin versus sericeo, superne glabro, c. 0·7 mm. infra stigmatem minutum abrupte rectangulare curvato. [Legumen rectum, cylindricum, acutum, glabrescens, c. 4 mm. longum, 1·7 mm. latum, 2–3 spermum. *Semina* subcuboidea seriatim foveolata].

SENEGAL ; Cayor, sandy places *Heudelot* s.n. holotype (lectotype of *I. sericea* Benth. ex Bak.), M'bidjem *Thierry* 89, *Farmer* 73, *Berhaut* 950 P, Niayes *Chevalier* 3385 P. GOLD COAST ; N. Territory, Gonjo damongo, prostrate shrublet, *Morton* in GC 9959, FR. NIGER COL. ; *Hagerup* 475 BM pp. NIGERIA ; Nupe *Barter* 973.

I. megacephala *Gillett* sp. nov.

Ab *I. capitata* Kotschy magnitudine inflorescentiae, foliisque simplicibus vel 3-foliolatis, differt.

Herba sublignosa c. 1·3 m. alta, ramis brunneis ± appresse pubescentibus. *Folia* superiora simplicia vel pinnatim 3-foliolata, inferiora haud visa. Folia simplicia anguste lanceolata ad 5 cm. longa et 6 mm. lata, ubique pubescentia, pilis brevibus c. 0·4 mm. longis, ad margines patentibus, aliis appressis, stipulis brunneis acuminatis c. 2 mm. longis, petiolo 1–2 m.m longo, nervo mediano subtus valde prominente, superne impresso. Folia 3-foliolata petiolo c. 5 mm. longo, rhachide 1–2 mm. ultra foliola lateralia prolongata, foliolis lateralibus terminale duplo brevioribus. *Inflorescentia* panicula condensata terminalis, foliis in bracteas transeuntibus involucrata, capituliformis, multiflora, ad 4 cm. lata, 3 cm. longa. Rami inflorescentiae, bracteae, pedicelli, calycesque brunnei, dense strigoso-pubescentes, pilis subpatentibus. *Calyx* ad anthesin c. 4 mm. longus, tubo c. 0·5 mm. longo incluso, lobis subaequilongis lineari-lanceolatis, c. 0·4 mm. latis ; post anthesin elongatis, lobis ad 12 mm. longis 0·6 mm. latis. *Vexillum* ellipticum, apice obtusum, basin paulo attenuatum, extus pubescens, c. 4 mm. longum, 1·9 mm. latum. *Alae* glabrae, suboblongae, c. 0·8 mm. latae, 3·5 mm. longae, unguiculo 0·6 mm. longo incluso. *Carina* praecipue ad commissuram strigosa, calcarata, haud rostrata, c. 4 mm. longa. *Stamina* omnia fertilia, filamentis c. 3 mm. longis, antheris atratis, late ellipticis, basin submuticis, c. 0·4 mm. longis, mucrone apicale incluso. *Ovarium* strigosum 1–2-ovulatum, c. 0·7 mm. longum, stylo basin strigoso, superne glabro et curvato, stigmate capitato. *Legumen* submaturum strigosum, flavum, subcomplanatum, acutum, 1–2-spermum, c. 5 mm. longum, 1·7 mm. latum, 0·7 mm. crassum.

FRENCH GUINEA, Betagya (?=Betaya), 11° 3′ W., 9° 50′ N., c. 330 m. Open grass savannah with *Parkia biglobosa*, *Cussonia longissima*, *Uapaca* sp., *Ficus* sp., severely burnt annually, gravelly stony soil near a granite outcrop, 9.10.1951, *D. Small* 498 holotype. Hairy woody stemmed herb c. 1·3 m. tall with yellow flowers.

I. latisepala *Gillett* sp. nov.

" *I. nigricans Vahl* ? " sensu Bak. F.T.A. **2,** 78 ; Hutch. et Dalz. F.W.T.A. **1,** 391 : non Vahl ex Pers. Syn. **2,** 327 (1807), nec DC. Prod. **2,** 230.

Species *I. trichopodae* affinis : radice lignoso, sepalisque late lanceolatis basin contractis, bene distincta.

Suffrutex, radice lignoso, ramis cylindricis sublignosis, in partibus junioribus piloso pubescentibus, ad 35 cm. longis. *Folia* inferiora 4-jugata ubique pilis tenuibus mollibus ± patulis fere basifixis dense vestita subtus etiam pilis rigidis medifixis ± appressis paucis praedita ; stipulae lineares c. 5 mm. longae ; rhachis ad 15 mm. longa, petiolo c. 3 mm. longo incluso, ultra foliola lateralia opposita 1–2 mm. prolongata ; foliola elliptica ad 6 mm. longa, 3 mm. lata, apice rotundata, mucronata. *Folia* superiora reducta, 3–2- vel 1-jugata, suprema monophylla. *Flores* in axillis foliorum superiorum (sive bractearum) solitarii, pedicellis tenuibus 9–12 mm. longis, c. 1 mm. infra calycem articulatis, infra articulum stramineis fere glabris, supra articulum subnigris pilosis. (Verisimiliter pars inferior vero est pedunculus racemi reducti uniflori, pars superior sola pedicellus ipse). *Calyx* ad anthesin pilosus, pilis densis patulis 1 mm. longis, fere ad basin fissus, tubo 0·3 mm. longo, lobis lanceolato-acuminatis, basin c. 0·5 mm. latis, 1 mm. supra basin c. 1·1 mm. latis, 3·5 mm. longis : post anthesin accrescens, lobis ad 1·6 mm. latis, 4·5 mm. longis. *Vexillum* extus pubescens, ellipticum, emarginatum, 4 mm. longum, apiculo 0·4 mm. longo incluso. *Alae* glabrae, c. 3 mm. longae. *Carina* pilosa, haud rostrata, 3·7 mm. longa, calcare acuto 0·6 mm. longo. *Stamina* omnia fertilia, filamentis 3–3·5 mm. longis, antheris basin muticis, ellipticis, 0·6 mm. longis, mucrone apicale fusco 0·2 mm. longo incluso. *Ovarium* pilosum 2-ovulatum, 0·8 mm. longum, stylo 2 mm. longo, ad mediam per angulum 60° curvato, infra mediam piloso, supra glabro, stigmate hemisphaerico 0·15 mm. diametro. *Legumen* (immaturum) pubescens, 2-spermum, 5·5 mm. longum, 1·7 mm. latum.

NIGERIA, on the Niger, *Baikie* 20 holotype.

The suggestion made by E. G. Baker, J. Bot. **41,** 194 (1903) and L.T.A. 107 that this plant might be the *I. elegans* of Schumacher is incorrect.

I. mildbraediana *Gillett* nom. nov.

" *I. subulifera Welw.*" sensu Tisserant Bull. Mus. Hist. Nat. Par. 2nd ser. **3,** 167 (1931) ; non Welw. ex Bak. F.T.A. **2,** 96 (1871).

Tisserant demonstrates that the *Welwitsch* isosyntypes of *I. subulifera* Welw. ex Bak. at Paris are a mixture of two species. He calls 2048 b first part species ' A ' and the remainder, 2048 a, 2048 b second part, 2049 a and b, 2050 a and b, species ' B '. Unfortunately he produces a completely inadmissable answer to the question which of these two species is the true *I. subulifera* Welw. ex Bak. Because Baker in his Key separates *I. subulifera* from its allies by its 1–2 seeded pods and because species A is 1–2 seeded, while species B, although 1–2 seeded in 2048 b second part, the only fruiting material which Baker saw, is up to 5 seeded in later gatherings by Antunes, Tisserant concludes that ' A' must be the true subulifera while ' B ' requires a new name. This conclusion must be reversed for the following reasons.

(1) the great majority of Baker's material is species B.

(2) since 2048 b shows no flowers Baker's description of the flowers must have been derived from species B.

(3) Tisserant's statement that Baker's diagnosis is composite and describes the fruit of one species, the leaves of two (leaflets oblong or oblanceolate) and the flowers of a second is erroneous. His description of the fruit as 1–2 seeded applies to both that part of Welwitsch 2048 b belonging to species A and to that part belonging to species B. The fact that Tisserant has seen a later specimen collected by Antunes, which has fruits up to 5 seeded, and which he assigns to species B is completely irrelevant. The leaves in species B are either oblong, oblong-elliptic, lanceolate or oblanceolate so that Baker's description oblong *or* oblanceolate fits this species. The fact that they are consistently oblanceolate in the fragment of species A is merely extra evidence that he was not describing this species.

(4) Baker's ' leaflets 7–13 ' and ' upper racemes exceeding the much reduced leaves ' fits ' B ' but not ' A' whose leaflets are not more than 9 and whose inflorescences are always shorter than the leaves, which are not much reduced above.

(5) Baker's " calyx 1/8″ long, divided almost to the base " agrees with B. The calyx is 1/16″ long, divided hardly below the middle in A.

(6) Baker's " branches finely grey downy " applies to B, whose hairs are more or less spreading but not to A whose hairs are all closely appressed.

To sum up, there is not a single item in Baker's description which does not apply to the rich material of species B which he examined while there is a whole series of points in which it conflicts with the few imperfect scraps of species A which were mixed with B in one of the 6 Welwitsch numbers concerned. Under these circumstances it is impossible to maintain that Baker's description is composite, or to use his name for any other species than the one which he describes namely species ' B '. Tisserant's nom nov. *mounyinensis* is thus a synonym for *I. subulifera* Welw. ex Bak. while his species ' A ' requires a new name, and it seems appropriate that it should be named in honour of the last of the great pioneer botanical explorers of Tropical Africa, whose specimen of this species collected 40 years ago has lain until now in the Kew Herbarium unnamed.

Nigeria. N. Provinces, Mongu, Bauchi plateau 1290 m., bushy, 60–90 cm. tall, flowers red, 8.7.1921, *Lely* 395. Near Jos, abundant in disturbed grassland, 70 cm. tall, *J. K. Morton* K 344. Bauchi Plateau, plains, 50 cm. tall, Aug. 1930, *Lely* P. 594. Osi - Okeopin path, Ilorin Prov. open savannah, much branched herb c. 130 cm. tall, 26.12. 1950, *Ajayi* in FHI 19297.

Fr. Congo Upper Lobaje c. 50 km. S.E. of Buar 8–900 m., 18.6.1914, *Mildbraed* 9616. Gaboon *Thollon* 1032 P. Chari *Chevalier* 6473 P. Oubangui Bosoum distr. *Tisserant* 2871 K, (P). A. E. Sudan Bongo land Sabbi (steppe), 3.12.1869, *Schweinfurth* 2728. Tanganyika T6 Kibungu, Morogoro 360 m., June 1930, *Haarer* 1885 K, EA, Ulugurus, High grass-low tree savannah, *Hill* 42 K, EA. Kimboza forest reserve, Morogoro distr., common herb or shrub up to 90 cm. tall, more common in grassland, July 1952, (in fruit), *Semsei* 795 K, (EA). Angola Pungo Andongo, near Calunga, erect, 50–70 cm. tall May 1857 *Welwitsch* 2048 b p.p. BM iso, P. holotype.

The position of this species in the Belgian Congo is obscure. Dr. Cronquist, F.C.B. **5,** 156 gives a description of ' *I. subulifera* ' which fits the true *subulifera* (*I. mounyinensis* Tiss.) on the other hand his statement that ' *I. subulifera* ' occurs in Oubangui gives reason to suppose that, in some cases at least, he may apply that name to *I. mildbraediana.*

I. pobeguinii *Gillett* sp. nov.

I. emarginellae affinis. Ab ea foliolis lanceolatis apice 1 mm. mucronatis, bracteis brevibus subpersistentibus, floribus post anthesin erectis vexilloque caduco differt.

Herba sublignosa erecta ubique pilis medifixis minutis (c. 0·2 mm. longis) appressis induta, ramis costatis rubro-purpureis. *Folia* 3-jugata ; stipulae subulatae c. 1·5 mm. longae ; rhachis rubro-purpurea 3–5 cm. longa, petiolo 8–10 mm. longo incluso, ultra foliola lateralia 4–6 mm. prolongata ; stipellae filiformes c. 1·5 mm. longae ; petioluli c. 1·5 mm. longi ; foliola subcoriacea, lanceolata, costa superne impressa inferne valde prominente, apice 1 mm. mucronata, c. 3 cm. longa, 1 cm. lata. *Racemi* 2–4 cm. longi, pedunculo 8–14 mm. longo incluso ; bracteae deltoideo-subulatae ad 1·5 mm. longae subpersistentes ; pedicelli c. 0·7 mm. longi. *Calyx* late campanulatus, tubo c. 1 mm. longo, dentibus late deltoideis c. 0·3 mm. longis, sinu superiore 3 mm. lato, sinibus lateralibus 1·3 mm. latis, inferioribus 1 mm. latis. *Vexillum* mox caducum, extus dense appresse fulvo-pilosum, ovatum, c. 6 mm. longum, 3·5 mm. latum. *Alae* late falcatae, extus appresse fulvo-pilosae, 6 mm. longae, unguiculo 0·5 mm. longo incluso. *Carina* extus appresse fulvo-pilosa, breviter subrostrata, c. 0·6 mm. calcarata, c. 6·5 mm. longa. *Stamina* omnia fertilia, filamentis 5·5–6·5 mm. longis, antheris basin pilis paucis obsitis, ovatis, 0·7 mm. longis, mucrone apicale fusco 0·2 mm. longo incluso. *Ovarium* post anthesin erectum, appresse strigosum c. 5-ovulatum, c. 4 mm. longum, in stylum glabrum c. 2·5 mm. longum, paulo infra mediam per angulum 95° curvatum, sensim attenuatum, stigmate incurvato minuto. *Legumen* haud visum.

Fr. Guinea Kouroussa, flowers dark red, *H. Pobéguin* 976 P holotype. No date is given but the specimen was received in Paris on 14.6.1904.

I. heudelotii *Benth. ex Bak.* F.T.A. **2,** 85 (1871) s. str., quoad descriptionem et *Heudelot* 611 p.p. ; L.T.A. no. 104 p.p.

var. **heudelotii**

I. sofa Scott-Elliott, J. Linn. Soc. **30,** 76 (1894) ; L.T.A. no. 109.

I. djalonica A. Chev. ex Hutch. & Dalz. F.W.T.A. **1,** 391 (1928) ; Kew Bull. **1929,** 16 ; Bak. f. L.T.A. 879 (1930) ; non ex Bak. f. L.T.A. 147 (1926).

Port. Guinea *Espirito Santo* 1714 ; Fr. Guinea *Heudelot* 611 p.p. lectotype, *Pobéguin* 598, *Chevalier* 18584 P p.p. K holotype of *I. djalonica* A. Chev. ex Hutch. & Dalz. ; Sierra Leone *Scott Elliot* 4613, 5083 syntypes of *I. sofa*, 4831, 5080, *Deighton* 3201, 3462, 5017, *Thomas* 3488, 3753 ; Nigeria *Dent Young* 49, *Sampson* 42, *Lely* 698, *Savory & Keay* in FHI 25260, *Meikle* 763 ; Brit. Cameroons *Maitland* 1720, *Johnston* 4 FHI.

var. **fairchildii** (*Bak. f.*) *Gillett* stat. nov.

I. fairchildii Bak. f. J. Bot. **70,** 252 (1932).

Port. Guinea *Espirito Santo* 2908 ; Fr. Guinea *Fairchild* 1275 BM holotype.

The material at Kew which was cited by Baker in his description of *I. heudelotii* is heterogeneous. It consists of two parts : A the sheet of *Heudelot* 611 from Hooker's herbarium and B a second sheet of this number from Bentham's herbarium and *Morson* s.n. from Sierra Leone. Of these A agrees with Baker's description in all respects and has been

labelled in Baker's handwriting as the type of *I. heudelotii*. B differs from the description in the 7 items listed below. There can thus be no hesitation in designating A as the lectotype of *I. heudelotii*. B agrees well with the type of *I. heudelotii* var. *elliotii* Bak. f. which is here treated as a distinct species.

A, and Baker's description of *I. heudelotii*	B. (*I. elliotii*)
(1) stems ' thinly pilose '	stems glabrous or with a very few appressed hairs.
(2) ' leaflets 7–13 '	leaflets not more than 9.
(3) racemes ' 6–12 ' flowered . .	racemes 3–5 flowered.
(4) peduncles ' pilose '	peduncles glabrous.
(5) 'peduncles 3/4–1 in. long ' . .	peduncles (including inflorescence axis) under 3/8 in. (Baker apparently means the whole inflorescence-axis by ' peduncle ')
(6) ' calyx 1 line deep '	calyx 3/4 line deep.
(7) ' pod 1/2–5/8 in. long ' . .	pod c. 3/8 in. long.

Besides these differences the stamens are shorter in *I. elliotii* (c. 3 mm. instead of 4·5 mm.) and the whole plant dries a darker colour.

As first explained by Tisserant in Bull. Mus. Hist. Nat. Par. 2nd ser. **3,** 269 the nomen nudum *I. djalonica* A. Chev. Expl. Bot. Afr. Occ. Fr. **1,** 173 was based on a mixture of two species numbered *Chevalier* 18584 ; species ' A ' being *I. heudelotii* and ' B ' being *I. secundiflora* according to Tisserant, but, in my opinion, *I. atriceps* ssp. *alboglandulosa*. A sheet of ' B ' was borrowed by E. G. Baker and described briefly, badly but validly in L.T.A. 147 (1926) a sketch being preserved in the British Museum. A duplicate of 'A ' was distributed to Kew where it was described by Hutchinson and Dalziel in 1928 and 1929. Lastly Hutchinson and Dalziel's description was taken up by E. G. Baker in the addenda to his L.T.A. without reference to his earlier use of the same name in Vol. **1.**

I. elliotii (*Bak. f.*) *Gillett* stat. nov.

I. heudelotii Benth. ex Bak. F.T.A. **2,** 85 p.p. non quoad descriptionem ; sensu Berhaut Fl. Senegal 52.

I. heudelotii var. *elliotii* Bak. f. J. Bot. **41,** 261 (1903) ; L.T.A. p. 124.

Senegal *Berhaut* 960 IFAN ; Fr. Guinea *Chevalier* 12134 P, Rio Nunez *Heudelot* 611 pp ; Sierra Leone *Morson* s.n., *Scott Elliot* 4063, 4083 BM, 5841 K iso, BM holotype, *N. W. Thomas* 64, 3221, 3824, 4570, 4663, 5896, 6030, 6052, 6281, 6666, 6938, 7221, 7340, 9049, 9078, 9206, 9576, 9618, *Deighton* 336, 892 *Glanville* 13 K, BM, *Jordan* 676, *Hunter* 46 BM ; Liberia *Linder* 1553.

I. wituensis *Bak. f.*, J. Bot. **41,** 243 (1903) ; L.T.A. no. 97.

var. **occidentalis** *Gillett* var. nov.

A var. *wituense* foliolis minoribus (7 mm. longitudine haud excedentibus) superne pilis gracilibus apressis vestitis differt.

N. Nigeria Bauchi plateau, plains, a slender branched annual c. 50 cm. tall, the whole plant sticky, flowers red, Sept. 1930, *H. V. Lely* P 693 holotype.

The stickiness referred to is due to the glandular margins of the leaflets. Such glandular leaflet-margins occur in several East African species of *Indigofera* besides *I. wituensis*, *I. tanganyikensis* being the commonest of these, but have not been observed in any other West African species.

I. conferta *Gillett* nom. nov.

I. grisea Bak. F.T.A. **2,** 80 (1871) ; L.T.A. no. 88, pro maj. parte, non Desv. (1826).

Nigeria Jebba (Nupe) c. 4° 20′ E., 8° 35′ N., on the Niger (Quorra), rocky soil after rain, flowers scarlet, 1858, *Barter* 940 holotype. Ilorin Prov. Lafioji distr. Oro forest reserve near cairn 6, savannah woodland with *Isoberlinia*, *Afzelia*, *Detarium*, *Burkea* above and *Loudetia* covering the ground. Herb c. 80 cm. tall 9.8.1951 *M. C. Ejiofor* in FHI 29389.

Besides Barter's plant, Baker cites Dr. Irving s.n. from Abbeokuta which is however, a specimen of *I. bracteolata* DC. No doubt it was this specimen which led Hutchinson & Dalziel in F.W.T.A. **1,** 393 to sink *I. grisea* Bak. in *I. bracteolata*. One statement in Baker's description ' flowers sometimes solitary ' seems to be based on Dr. Irving's plant and does not apply to the present species. Otherwise the description is based on *Barter* 940. Baker's statement that the corolla is twice as long as the calyx is wrong. In *I. conferta* the corolla is c. 4 mm. the calyx c. 3 mm. long ; in *I. bracteolata* the proportion is much the same. Actually *I. conferta* is but superficially similar to *I. bracteolata* ; the main differences are tabulated below.

I. bracteolata	*I. conferta*
(1) glandular hairs absent.	glandular hairs on stem and leaf rhachis.
(2) bracts often ± leaf-like (or flowers sometimes single in the axils of simple leaves)	bracts minute showing no transition to leaves (flowers always 2 or more together in small dense racemes).
(3) leaves often simple	leaves never simple.
(4) leaf indumentum long, fine, ± spreading	leaf indumentum shorter, stiffer, appressed.
(5) upper calyx lobes accrescent, wider than the lower	calyx lobes all alike, narrow, not accrescent.
(6) petiole (of pinnate leaves) 3–8 mm. long	petiole c. 1 mm. long.
(7) pedicel 2–3 mm. long	pedicel c. 0·5 mm. long.
(8) pod flat, 1-seeded, oval, sparsely pubescent	pod ± terete, 2–3 seeded, oblong, densely pubescent.
(9) endocarp not spotted	endocarp spotted.

Among the African *Indigofera* species which have glandular hairs *I. conferta* is readily recognised by its very short sessile inflorescences.

I. atriceps *Hook. f.* ssp. **alboglandulosa** (*Engl.*) *Gillett* stat. nov.

I. alboglandulosa Engl. Hochgebirgsflora Afrikas, 258 (1892).

I. djalonica A. Chev. ex Bak. f. L.T.A. no. 179 (1926) ; non ex Hutch. & Dalz. F.W.T.A. **1,** 391 (1928) nec Kew Bull. **1929** 16 ; nec sensu Bak. f. L.T.A. 879 (1930).

I. setosissima Harms var. *major* Cronquist Bull. J. Bot. Et. Brux. **22,** 226 (1952).

Widely spread in Tropical Africa.

I. omissa *Gillett* sp. nov.

I. elliotii affinis, ab eo racemis multifloris, pedunculis multo longioribus, fructibusque patentenibus vel subreflexis, differt.

Frutex (vel herba sublignosa) erecta, ramis subangulatis, sparse et appresse pilosis. *Folia* inferiora haud visa, superiora 3-vel saepius 5-foliolata ; stipulae subulatae 1–2 mm. longae ; rhachis sparse appresseque strigosa, ultra foliola lateralia 2–4 mm. prolongata, ad axillas foliolorum pilis atro rubis confertis praedita, 15–25 mm. longa, petiolo 12–14 mm. longo incluso ; foliola cuneato-obovata vel cuneato-oblanceolata, apice rotundata, apiculata, petiolulis 1 mm. longis, superne glabra, inferne sparse appresseque pilosa, ad 20 mm. longa, 10 mm. lata, terminale quam lateralia paulo majore. *Racemi* multiflori, ad 40 mm. longi, pedunculo 6–7 mm. longo incluso, sparse appresseque pilosi ; bracteae c. 1 mm. longae, deciduae ; pedicelli 1 mm. longi, post anthesin patentes vel subreflexi. *Calyx* strigosus, tubo c. 0·8 mm. longo, lobis deltoideo-subulatis c. 1 mm. longis, inferiore quam alios paulo longiore, sinu superiore quam sinos alios dimidio latiore. *Vexillum* extus appresse pubescens, anguste obovatum, 4·5 mm. longum, 3 mm. latum. *Alae* glabrae, suboblongae, apice subacutae, 3 mm. longae, unguiculo 0·2 mm. longo incluso, 0·8 mm. latae. *Carina* extus pubescens, c. 0·5 mm. calcarata, haud rostrata, c. 3·5 mm. longa. *Stamina* omnia fertilia, filamentis c. 3 mm. longis, antheris ellipticis, basin muticis, c. 0·7 mm. longis, appendice apicale 0·2 mm. longo incluso. *Ovarium* glabrum 2·5 mm. longum, c. 8-ovulatum, in stylum ascendentem c. 0·6 mm. longum sensim attenuatum, stigmate subgloboso 0·1 mm. diametro. *Legumen* glabrum, apice acutum, c. 7-spermum, 9–22 mm. longum, 1·4 mm. latum, endocarpio maculato.

Fr. Sudan Koulikoro, 6–14.10.1899, *Chevalier* 3234 P. Mossi-Mont Zougapiguie near Zorgo, 31.7.1910, *Chevalier* 24643 P. Maçina, country of the Habés, rocks of Kani Kombolé, c. 3° 36′ W., 14° 9′ N., c. 320 m., 3.9.1910, *Chevalier* 24900 K holo P isotype. Cercle de Bamako, plain, August 1929, *Waterlot* 1326 P. Sanga near Bandiagara, used as vermifuge, 22.7.1937, *Mme. Ganay* 62 P, without locality *Scaëtta* 3211 P. Dahomey Atacora Mts. Farfa-Koukountouna, 16.6.1910, *Chevalier* 24071 P.

This plant was omitted by Chevalier in Expl. Bot. de l'Afr. Occ. Franc., by Hutchinson and Dalziel in F.W.T.A. and by Tisserant in Bull. Mus. Hist. Nat. Par. 2nd ser. **3,** 258–272 (1931). E. G. Baker, L.T.A. 149, mentions it as ' closely allied to *I. subcorymbosa* Bak. ' which hardly seems to be the case.

I. deightonii *Gillett* sp. nov.

I. hirsutae affinis : ab ea foliolis paucioribus, indumento calycis leguminisque breviore et leguminibus angustioribus differt.

Herba forsan annua, sublignosa, ramis brunneis subprostratis sparse pilosis. *Folia* 3–5-foliolata ; stipulae pilosae c. 4 mm. longae ; rhachis ± patente pilosa 25–30 mm. longa, petiolo 9–10 mm. longo incluso, ultra foliola lateralia 6–8 mm. prolongata ; stipellae filiformes 0·5 mm. longae ; petioluli hirsuti 1 mm. longi ; foliola oblongo-lanceolata, apice rotundata vel truncata, apiculata, superne sparse, inferne densius, pilosula, ad 28 mm. longa, 11 mm. lata, terminale quam lateralia paulo majore. *Racemi* multiflori ad 15 cm. longi, pedunculo 2–3 cm. longo incluso ; rhachis breviter subpatente pilosa ; bracteae anguste lanceolatae, 2 mm. longae, mox deciduae ; pedicelli c. 0·5 mm. longi, post anthesin valde reflexi. *Calyx* pilis rigidis brunneis c. 0·3 mm. longis vestitus, tubo 0·4 mm. longo, lobis anguste deltoideis inaequalibus superioribus 1·4 mm. longis, lateralibus 2 mm. longis, inferiore 2·3 mm. longo. *Vexillum* ovatum, extus pubescens, 3 mm. longum, 2·5 mm. latum, apice rotundatum. *Alae* subdolabriformes, margine hirsutae, 2·3 mm. longae, unguiculo 0·2 mm. longo incluso, 0·8 mm. latae. *Carina* pubescens, 0·5 mm. acute calcarata, haud rostrata, 3·6 mm. longa. *Stamina* omnia fertilia, filamentis 2·5–3 mm. longis, antheris ellipticis, basin muticis, 0·4–0·5 mm. longis, appendice apicale 0·1–0·2 mm. longo incluso. *Ovarium* pilosum 1·4 mm. longum, 4-ovulatum, stylo c. 2 mm. longo ad mediam per angulum 45° sensim curvato, stigmate globoso. *Legumen* atro-brunneum, patente albide pilosum, 5–9 mm. longum, 1·3 mm. latum, 1 mm. crassum, 3–4-spermum, endocarpio maculato. *Semina* ut in *I. hirsuta* quadrangulata et foveolata.

Fr. Guinea N' Zérékoré on Mt. Koiré, 750 m., 7.9.1949, *J. T. Baldwin Jr.* 13301. Sierra Leone Magbile, 30 m., 8.12.1914, *N. W. Thomas* 6186. Masactaba N. Prov., 13.10.1928, *Glanville* 34. Newton, waste places on farm, prostrate, flowers red, 29.11.1936 *F. C. Deighton* 3283 holotype. Musaia, along pathsides, woody, prostrate forming a carpet, flowers red, 27.9.1948, *Deighton* 4864. Waterloo hill Rokupr, in large clumps among rocks, flowers red, 22.10.1949, *H. D. Jordan* 367. Falaba rest house, low recumbent herb with deep red flowers in spikes 75 mm. long, 28.9.1951, *D. Small* 309. Liberia Central Prov. Sanokwele distr. Gbau, on rock outcrop, flowers pink, 22.9.1947, *Baldwin* 9436. Nigeria Jeba on the Kworra (Niger) 1858 *Barter* s.n. Ondo Prov. Akure distr. Apomu forest reserve, on rock among grasses, *Ipomaea*, *Tephrosia*, *Hibiscus*, a creeper with red flowers, 4.11.1949, *Latilo & Olorunfemi* in FHI 24446. A.-E. Sudan Yambi distr. Mt. Bangeuze, 870 m., 50 cm. tall, flowers red, occasional, 26.5.1939, *F. W. Andrews* 1487.

I. conjugata *Bak.* var. **occidentalis** *Gillett* var. nov.

I. dalzielii Hutch. Kew Bull. **1921,** 246 ; F.W.T.A. **1,** 393 ; L.T.A. no. 46 pro minore parte.

A varietibus aliis *I. conjugatae* pilis ramorum inflorescentiarumque crispidulis, apice patentibus, foliisque saepius simplicibus differt.

Fr. Sudan Bougouni c. 12° 30′ W., 11° 30′ N., 15.2.1938, *Roberty* 3496 IFAN. N. Nigeria Kontagora, 7.1.1906, *Dalziel* 27 holotype, syntype of *I. dalzielii* ; Liruwen-Kano hills, 1921, *Carpenter* s.n. ; Bichikki, 660 m., 23 cm. tall, 19.5.1921, *Lely* 188 ; Zaria prov. Anara forest reserve, Kau Gimi in *Isoberlinia doka* open woodland, erect herb among young grass, 11.5.1948, *Keay* in FHI 22959 ; Igabi distr. 27 km. N. of Kaduna, *Isoberlinia - Monotes* open woodland, perennial herb, stems ascending not erect, 23.5.1950, *Keay* in FHI 25798 ; Giwa distr. Samaru, regrowth savannah of *Isoberlinia doka*, semierect to 30 cm. tall, 28.6.1950, *Keay* in FHI 25909 ; B. Gwari distr., Mando forest reserve, perennial herb with tough rootstock, 9.8.1950, *Keay* in FHI 25999 ; Kontagora Div. Utachu–Madengyen, laterite outcrop, dry stony soil under savannah bush on recently burnt ground, erect from thick woody rootstock, 20.1.1950, *Meikle* 1067 ; Benue Prov., Idoma distr., *Jones* in FHI 7363.

Most specimens cited by Hutchinson as *I. dalzielii* have appressed indumentum, as is stated in the description. That name can thus not be used for this variety.

All forms of *I. conjugata* tend to have some of the lower leaves simple ; in var. *occidentalis* this tendency is usually, though not always, more pronounced, *Lely* 188, and *Carpenter* s.n. show only simple leaves. Such plants pass imperceptibly into certain forms of *I. bongensis* Kotschy + Peyr., e.g. *Chevalier* 7424. As both crisped hairs and simple leaves are characteristic of *I. bongensis* it might be possible to consider var. *occidentalis* as the result of hybridisation between that species and *I. conjugata*.

I. parviflora *Heyne ex Wight & Arn.* var. **occidentalis** *Gillett* nom. et stat. nov.

" *I. linearis* " sensu Guill. & Perr. Fl. Seneg., 184 (1832) ; L. T.A. no. 244 ; non DC. Prod. **2,** 228 (1825).

" *I. parviflora Heyne* " sensu Hutch. & Dalz. F.W.T.A. **1,** 391 ; Berhaut Fl. Seneg. 53 ; non Heyne ex Wight & Arn.

A var. *parviflora* foliis 1–3 (haud 3–6)-jugatis, superne appresse strigosis, leguminibusque patentibus (haud semper deflexis) differt.

Cape Verde Isles *Chevalier* 44336 etc. ; Senegal *Leprieur* s.n. BM iso (P holotype), *Heudelot* 525, *Berhaut* 1731 P etc. ; N. Rhodesia Barotse land *Gardner* 526 ; Angola *Gossweiler* 311 ; N. Central Cape nr. Kuruman *Silk* 221.

I. longicalyx *Gillett* sp. nov.

I. lateritia Chev. Expl. Bot. Afr. Occ. Fr. **1,** 174 nomen, non Willd.

" *Microcharis tenella Benth.* " sensu Bak. f. L.T.A. p. 256 p.p. et Hutch. & Dalz. F.W.T.A. **1,** 388 p.p., non Benth.

Species *I. richardsiae* affinis ; calyce quam corolla longiore, indumento que differt.

Herba annua, ramis vel prostratis vel erectis ad 16 cm. longis, ± hispida, pilis rigidis ± patentibus biramosis, ramo unico brevi appresso, altero multo longiore patenti, pilis juvenilibus flavescentibus. *Folia* simplicia, lanceolata, acuta, basin in petiolum c. 1 mm. longum sensim attenuata, stipulis anguste lanceolatis vel deltoideo-subulatis, hispidis, 2–4 mm. longis, lamina ad 4 cm. longa, 6 mm. lata, inferne et ad margines pilis biramosis eis ramorum subsimilibus, ad paginam superiorum pilis minus rigidis subsimplicibus induta. *Racemi* immaturi c. 6-flori, ad 4 cm. longi, pedunculo 2 cm. longo incluso, nonnunquam flore singula ad basin pedunculi in axillo folii oriente, pilis eis ramorum similibus, bracteis lanceolatis, hispidis persistentibus 1·5–3 mm. longis, pedicellis patentibus hispidis ad 3 mm. longis. *Vexillum glabrum* ± orbiculare, c 4 mm. longum, 4 mm. latum. *Alae* glabrae ± oblongae, c. 4·5 mm. longae, unguiculo 0·5 mm. longo incluso, c. 1·5 mm. latae. *Carina* glabra, apice rostrata, laterale paulo subsaccatim plicata, sed haud calcarata, 4·5 mm. longa, unguiculo 1·3 mm. longo incluso. *Stamina* c. 3 mm. longa, superius liberum, brevius, sine anthera ; antherae ellipticae c. 0·3 mm. longae, apice apiculatae, quinque ad filamenta longiora basin submuticae, quattuor ad filamenta breviora basin squamo hyalino c. 0·2 mm. longo appendiculatae. *Ovarium* strigosum, 2 mm. longum, c. 19-ovulatum, stylo glabro compresso c. 1·2 mm. longo sensim et paulo curvato, stigmate magno oblique discoideo, c. 0·3 mm. diametro. [*Legumen* immaturum glabrescens 16-spermum].

Fr. Guinea Fouta Djalon, Dalaba–Diaguissa plateau, 1000–1300 m., 17.10.1907, *Chevalier* 18873 isotype of *I. lateritia* A. Chev. non Willd. ibid 6.10.1907, *Chevalier* 18771 P. Sierra Leone Kaballa 360 m. vern. name MWIYE, 18.9.1914, *Thomas* 2265. N. Nigeria Jos (or Bauchi) plateau, without exact locality, plains, Aug. 1930, flowers red, *Lely* P. 643 holotype. Naraguta, 8.8.1921, flowers red, *Lely* 504. Vom, 900–1350 m., 1922, *Dent Young* 51.

The fruit is described from *Chevalier* 18873 which, with *Thomas* 2265, differs somewhat from the Bauchi plateau specimens in the indumentum.

Although *I. longicalyx* has hitherto been confused with *I. hutchinsoniana* (*Microcharis tenella*) it is really much more closely related to *I. richardsiae* (*Microcharis angolensis*).

I. richardsiae *Gillett* sp. nov.

Microcharis angolensis Bak. F.T.A. **2,** 132 probably, non *Indigofera angolensis* D. Dietr.

Herba annua ad 12[–45] cm. alta, ramis ± erectis hispidis, pilis rigidis ± medifixis crispis. *Folia* lanceolata acuta, basin in petiolum 0·5–1 mm. longum attenuata, stipulis lanceolato-subulatis 2–3[–7] mm. longis, setaceis, lamina ad 40[60] mm. longa et 6[9] mm. lata, inferne et ad margines pilis ± medifixis crispis hispida, superne pilis fere simplicibus longe et sparse pilosa. *Racemi* c. 10-flori, 3 5[–13] cm. longi, pedunculo 10 15[–20] mm. longo incluso, rhachide pilis ± medifixis crispis hispida, bracteis persistentibus anguste deltoideis, setaceis 1–1·5[–2] mm. longis, pedicellis hispidis c. 4 mm. longis, ad, et praecipue post, anthesin rigide patentibus. *Calyx* hispidus, 2 mm. longus, tubo lobos acuminato-deltoideos aequante. *Vexillum* glabrum, ellipticum, 4·5 mm. longum, 3·5 mm. latum. *Alae* glabrae ±, oblongae, apice rotundatae, 5 mm. longae, unguiculo 0·5 mm. longo incluso, 1·5 mm. latae. *Carina* glabra 5 mm. longa, unguiculo 1·5 mm. longo incluso, apice rostrata, laterale paulo subsaccatim plicata sed non calcarata. *Stamen* superius liberum sterile, sine anthero, quam alia 3·5–4 mm. longa brevius ; antherae ellipticae, c. 0·4 mm. longae, apice breviter apiculatae, basin quattuor ad filamenta breviora squama hyalina 0·3 mm. longa, quinque alternantes squama simile 0·1 mm. longa, praeditae. *Ovarium* hispidum 2·5 mm. longum, stylo glabro, paulo et sensim curvato, c. 1 mm. longo, stigmate magno incurvato 0·3 mm. diametro. *Legumen* lineare, fere rectum (apicem versus paulo curvatum), patens, pilis crispis medifixis ± dense obtectum, apice acutum, complanatum, ad suturas incrassatum, 17–21-spermum, 25–30 mm. longum, 1–1·1 mm. latum, 0·5 mm. crassum. *Semina* brunnea quadrata, 1 mm. longa, 1 mm. lata, 0·3 mm. crassa.

Tanganyika Tl Kwimba distr. May 1932, *Rounce* 33 K, EA ; Shinyanga *Koritschoner* 2017 EA. Port. E. Afr. Niassa Prov. Malema Div. Mutuali, Nalume Riv. Chief Capeia, on alluvial sands, prostrate annual herb, 12.5.1948, *Pedro-Pedrogas* 3351 EA. Nyasaland Fort Johnston, Ricinodendron–Hyphaene community, annual 22 cm. tall, *Exell, Mendonça & Wild* 855 BM. N. Rhodesia Abercorn distr., Pans road, 1500 m., verge of road in deep sand, flowers pink, 4.4.1952, *Mrs. Richards* 1268 holotype ; ibid., 22.3.1955, *Mrs. Richards* 5052. Angola Malange, in swamps, 21.9.1932, *Young* 826 BM. Pungo Andongo, along banks of Cuanza river near Calunda Quisonde 15–16° E, 9–10° S., a slender annual, flowers deep red, frequent in open sandy forests, Jan. 1857, *Welwitsch* 2004 K, BM isotypes of *M. angolensis*.

Welwitsch 2004 is taller than the others, has less crisped hairs and a longer, more slender, beak to the carina. It is without fruits. It may be specifically or varietally distinct. *Pedro-Pedrogas* 3351 shows fruits only. It is intermediate between *Welwitsch* 2004 and the remaining specimens.

I. richardsiae is named after Mrs. H. M. Richards whose splendid collections from the Abercorn district are adding greatly to our knowledge of the flora of central Africa.

I. hutchinsoniana *Gillett* nom. nov.

Microcharis tenella Benth. Tr. Linn. Soc. **25,** 297 t. 33 A (1866) ; L.T.A. p. 256 p.p. excl. syn : non *Indigofera tenella* Vahl ex DC.

" *Indigofera welwitschii Bak.* " sensu Hutch. & Dalz. F.W.T.A. **1,** 393, non Bak.

Nigeria Nupe, crevices of rocks after rains, flowers bright scarlet, *Barter* 1601 syntype. Jeba on the Kworra *Barter* s.n. lectotype. Quorra (Dagone) *Vogel* 99 syntype. Lokoja distr., 7.10.1907, *Parsons* L 34.

In *Barter* 1601 some of the bracts have grown out and become foliaceous. In general appearance this species closely resembles *I. longicalyx* which has, until now, been confused with it. The following characters serve to separate them.

	I. hutchinsoniana	*I. longicalyx*
(1)	Petiole sometimes as long as, or longer than, stipules, green on its upper surface, separated from lamina by a distinct joint	Petiole always less than half as long as stipules, not green on its upper surface, not separated from lamina by a joint.
(2)	Base of lamina rather abruptly narrowed, the margins forming an angle of c. 45° with the midrib.	Base of lamina very gradually narrowed, the margins forming an angle of c. 15° with midrib.
(3)	Indumentum finer with less medifixed hairs	Indumentum coarser with more medifixed hairs.
(4)	Calyx shorter than corolla and stamens	Calyx as long as, or longer than, corolla and stamens.
(5)	Keel not, or very shortly rostrate c. 3 mm. long	Keel markedly rostrate, c. 4·5 mm. long.
(6)	Anthers not apiculate at apex	Anthers apiculate.
(7)	Seeds 7–11	Seed 16–19.

The new name for this species is proposed in grateful recognition, not only of Dr. Hutchinson's great work on the flora of West Tropical Africa, but also of innumerable acts of kindness, over many years, to the present author, as to many other junior botanists.

I. disjuncta *Gillett* nom. nov.

α var. **disjuncta.**

I. acutifolia Schinz Abh. Bot. Ver. Brand. **30,** 163 (1888) non Schlecht. (1838).

" *I. arenaria A. Rich.* " sensu Bak., F.T.A. **2,** 79 (1871) ; Bak. f., J. Bot. **41,** 192 ; L.T.A. no. 44 ; Andrews, Fl. Sudan **2,** 208 ; et Schwarz, Fl. Trop. Arabien 101 pro parte, non A. Rich. tent. Fl. Ab. **1,** 183 (1847) nec *I. arenaria* E. Mey, Comm. Pl. Afr. Austr., 107 (1836).

I. semhaensis Vierhapper, Denkschr. Ak Wien **71,** 362 (42) (1907) p.p., non quoad typum.

I. welwitschii Bak. var. *simplicifolia* Bak. f., J. Bot. **70,** 253 (1932).

" *I. engleri Bak. f.* " sensu Sauvage, Rec. Bot. Miss. Anti Acr. du Sahara Occ. 13, non Bak. f.

Arabia Hejaz, within 40 km. of Jeddah, *Trott* 222, 1345, 1358 ; Mauretania Adrar Mts. c. 21° N. *Monod* 10649 IFAN ; Fr. Niger Col. Air, Mt, Tarraouaji 8° 25′ E., 17° 15′ N., 900 m., *Chopard & Villiers* s.n. IFAN ; Fr. Chad Terr. Tibesti *Monod* 7374 IFAN ; A.-E. Sudan Obak c. 34° 50′ E., 18° 10′ N. *Schweinfurth* (1866) 1813, (1868) 662 ; S.W. Africa between Aus and Tiraz c. 16° 5′ E., 26° 30′ S. 24.5.1885 *Schinz* s.n. Z holotype. Karibib *Dinter* (2523 B-holotype) 6971 Kisoneo type BM neotype of *I. welwitschii* var. *simplicifolia*, N. of Sabiesis *Pearson* 4112, Damaraland *Galpin & Pearson* 7612, Welwitsch *Worsdell* s.n. ; N.W. Cape Kenhardt div. N. of Poffadder *Acocks* 17599.

The leaf shape varies greatly. Sometimes (e.g. *Schweinfurth* 662) they are almost as broad as long ; in other cases (e.g. *Dinter* 6971) the upper leaves may be sublinear, about 20 times as long as broad. Schinz' type is narrow leaved, though not as extreme as *Dinter* 6971. All intermediates are found between the two extremes and at times both types of leaf occur on one plant. It does not therefore seem useful to base intra specific taxa on this character. *Dinter* 6971 BM was determined by E. G. Baker himself as *I. welwitschii* var. *simplicifolia* and is thus an appropriate neotype for that name. The indumentum, the long petioles (much longer than the stipules) and the pedicels, which at 0·5 mm. are unusually short for subgen. *Microcharis*, serve at once to distinguish this plant from any true simple leaved form of *I. welwitschii*, should one be discovered. Apart from var. *fallax*, *I. acutifolia* seems to be always unifoliolate. Statements to the contrary can be traced back to Richard's original description of a seedling of *I. hochstetteri* as *I. arenaria*. Although the species, as shown above, is very widely distributed, it seems to be usually extremely local. In spite of all the collecting that has now been done in the A.E. Sudan and Arabia it remains known from one spot only in the first and a very restricted area in the second country. The new name for the species is given on account of the remarkable gaps in its area of distribution.

β var. **fallax** *Gillett* var. nov.

I. leptocarpa Hochst. et Steud. ex Balf. f. Roy. Soc. Edin. **11,** 510 (14) (1882) p.p. non quoad typum.

A var. *acutifolia* foliis minoribus 6 mm. haud excedentibus, superioribus interdum trifoliolatis, differt.

Socotra *Bayley Balfour* 674 holotype, *Schweinfurth* 389.

Vierhapper records the species from Semha island near Socotra but the plant has not been seen. This variety has hitherto been confused with *I. tritoides*. The differences are as follows.

var. *fallax*	*I. tritoides*
Leaves mostly 1-foliolate	Leaves nearly all 3-foliolate.
Racemes shorter than leaf	Racemes much longer than leaf.
Corolla c. 2·5 mm.	Corolla c. 4 mm.
Fruiting pedicel c. 1·5 mm.	Fruiting pedicel c. 3 mm.
Seeds 5–10	Seeds 16–22.

Vascular Plants of Illinois.*—The area of the state of Illinois is approximately 57,926 square miles. The vascular plants treated in the book here under notice are classified as about 2,450 species of which some 75% are native to the region. The remainder migrated from various places, chiefly from Europe via the eastern states, during the past 150 years. In the present account the species are dealt with essentially on the basis of their ranges in the state. In place of a descriptive flora a list of records is given for every species with reference to synonyms, type localities, general range, and habitat. An important feature is the provision of an outline map, for every species or a combination of a few species, all the maps being drawn to the same scale. These maps are divided into counties and the ranges shown by small dots, circles, or triangles in the counties from which the species have been recorded. The arrangement of the families is that of the Engler system with some modifications. An outline summary of the flora and vegetation, a list of the principal collectors, a bibliography, and an index are provided. A very legible fount is used throughout and the authors, collaborators, and publishers are to be congratulated on the appearance of a work that will be of very great use to those interested in the phytogeography of North America.

W. B. Turrill.

* Vascular Plants of Illinois by G. N. Jones and G. D. Fuller, The University of Illinois Press, Urbana, pp. 593. 21 June 1955. $10.

British Wild Flowers.*—Botanists and *botanophils* alike will be delighted to see the contents of Dr. Hutchinson's three Pelican books (Common Wild Flowers, 1945 ; More Common Wild Flowers, 1948 ; and Uncommon Wild Flowers, 1950) put together into two neat volumes, with the addition of almost two hundred fresh drawings and descriptions of the rarer " natives " and " introductions ", and with supplementary notes on many of the plants previously described. To call such a work a "*Florula Britannica*" is surely to underestimate its many excellencies. Small though they may be in bulk and price, these volumes contain a wealth of detail, expounded with lucidity and imagination such as would do honour to many more pretentious tomes. It is nice to see *Koenigia islandica*, *Diapensia lapponica* and *Artemisia norvegica* making their *début* in a British Flora, but many will scan these pages for information on less *recherché* plants—and they are not likely to be disappointed, though it is perhaps regrettable that the whole gamut of British " Linneons " could not have been included.

One personal complaint must be lodged :—I had always regarded Dr. Hutchinson as commendably free from political bias—but to find that, throughout these pages, he has repeatedly and tacitly sunk "Northern Ireland" into synonymy under " Eire ", raises implications which even the most liberal of Ulstermen cannot allow to pass in silence !

R. D. Meikle.

* British Wild Flowers. By John Hutchinson, 2 vols., pp. 947 + XXXV, 809 pls. Penguin Books 1955. Price 10/- net.

NOTES ON ASIATIC ORCHIDS : I.

V. S. Summerhayes

Dendrobium delacourii *Guillaumin* in Bull. Mus. Nat. Hist. Nat. Paris, **30,** 522 (1924).

D. ciliatum Parish ex Hooker in Curt. Bot. Mag. **90,** t. 5430 (1864), non (Ruiz et Pavon) Persoon (1807).

Owing to the existence of the name *Dendrobium ciliatum* (Ruiz & Pavon) Pers. (Syn. Pl. **2,** 523 : 1807), based on *Maxillaria ciliata* Ruiz & Pavon, the epithet *ciliatum* cannot be used for the above wellknown Asiatic species.

The epithet *delacourii*, proposed by Guillaumin for a plant from Annam, and considered to be synonymous with *D. ciliatum* by Gagnepain, who had seen the type specimen, appears therefore to be the correct one for this species. Judging from the description, *D. delacourii* was based on a rather poorly developed specimen in cultivation at Paris ; in all essential features it agrees with Parish's plant.

Bulbophyllum nigripetalum *Rolfe* in Kew Bull. **1891,** 197.

I have shown previously (Kew Bull. **1951,** 471 : 1952) that this species was wrongly ascribed to West Africa by Rolfe. It is really a native of Western China, being allied to *B. nigrescens* Rolfe from Burma and *B. secundum* Hook. f., a native of north-eastern India. There is a specimen from Yunnan (*Henry* 13055) in the Kew Herbarium which agrees very well with the type specimen of *B. nigripetalum.*

It is probable that *B. inopinatum* W. W. Sm. is also an Asiatic species and not of African origin.

Uncifera verrucosa *Summerhayes*, sp. nov. ; ab aliis speciebus pedunculo ovariis sepalisque dense verrucosis, floribus scarlatinus, foliis carnosis subtus violaceo-notatis satis differt.

Herba epiphytica glaberrima ; caulis brevis, erectus, circiter 5 cm. altus, superne foliatus, basi radices flexuosas virides emittens. *Folia* disticha, patentia ; vagina arcta, 8–11 mm. longa, longitudinaliter rugulosa, purpureo-notata ; lamina ligulata, basi leviter angustata, apice inaequaliter obtuse vel subacute bilobata, lobis leviter erosis vel denticulatis, in toto 3·5–7 cm. longa, 1–2 cm. lata, carnosa, sectio leviter V-formis, supra canaliculata sordide viridis, subtus violacea vel violaceo-notata. *Inflorescentia* ex axillis foliorum delapsorum exoriens, horizontalis, racemosa, 5 cm. longa ; pedunculus crassus, 3–4 cm. longus, circiter 2·5 mm. diametro, cum rhachide dense verrucosus, sordide violaceus ; rhachis pedunculo similis sed viridis, dense 7–12-flora ; bracteae patentes, triangulares, acuminatae, circiter 2 mm. longae, ovario pedicellato multo breviores, violaceo-virides. *Flores* erecti, scarlatini vel corallini ; pedicellus cum ovario circiter 1 cm. longus, violaceo-roseus, dense pallide verrucoso-papillosus. *Sepalum* intermedium incurvatum, ellipticum vel orbiculari-ellipticum, rotundatum, intus valde concavum et fere cucullatum, 6 mm. longum et 4 mm. latum; sepala lateralia fere orbicularia, apice incurvata rotundata, 5·5 mm. longa, 4·5 mm. lata ; omnia sepala extra verrucosa. *Petala* orbicularia,

circiter 4·5 mm. longa et lata, apice leviter incurvata, extra fere laevia. *Labellum* obscure trilobatum, valde concavum, 4 mm. longum, ochraceum, extra rubescens ; lobus intermedius truncatus, intus valde incrassatus ; lobi laterales truncati vel leviter emarginati, marginibus subhyalinis, inferne incrassati ; calcar ex ore lato circinatim incurvatum, apice clavato-inflatum, 1·5 cm. longum, roseum. *Columna* brevis, crassa, sursum valde dilatata, androclinio levissime excavato apice cornu subulato instructo ; anthera galeata, apice rotundata, antice in appendicem linearem 1·6 mm. longam producta. *Pollinia* 2, pyriformia, profunde excisa, basi in caudiculis angustata, in toto 1 mm. longa ; stipes inferne angustus, sursum dilatatus, tertia parte apicali subito recurvatus furcatus, totus 5 mm. longus ; viscidium oblongo-ellipticum, 1 mm. longum.

Burma. The Triangle, coll. F. Kingdon Ward 1953–1954, cult. Messrs. Sanders, St. Albans, 25 July 1955 (type) ; North Triangle, Hkinlum, 1350 m. alt., 18 July 1953, *Kingdon Ward* 21171 (Herb. Mus. Brit.).

Described from a living plant and dried material. This is a typical member of the genus *Uncifera* agreeing with *U. obtusifolia* Lindl., *U. acuminata* Lindl. and *U. lancifolia* (King & Pantl.) Schltr. in the general structure of the flowers, particularly the column and pollinarium. It is remarkable for the verrucose peduncle, rhachis and sepals, and the scarlet or coral-red flowers.

It is very doubtful if some of the other species which have been placed in this genus are correctly referred to it, particularly those enumerated in the Flora of Indo-China. I am also not quite satisfied that the Malayan *Saccolabium tenuicaule* Hook. f. belongs to this genus, as stated by Holttum.

Aërides uniflora (*Lindl.*) *Summerhayes*, comb. nov.

Mesoclastes uniflora Lindl. Gen. & Sp. Orch. Pl. 45 (1830), excl. descr. florum.

Aërides longicornu Hook. f. Fl. Brit. Ind. **6,** 44 (1891) et in Hook. Ic. Plant. **22,** t. 2127 (1893).

In 1830 Lindley (see reference above) described the genus *Mesoclastes* containing two species, one of which, namely, *M. brachystachys*, is now known as *Luisia brachystachys* (Lindl.) Bl. It is also clear that the genus *Mesoclastes*, as described by Lindley, is congeneric with the older *Luisia* Gaud. This genus is characterised by the possession of rather small flowers on a very short, or if longer, very stout, peduncle.

The second of Lindley's species of *Mesoclastes*, *M. uniflora*, was, however, described as possessing solitary flowers, one of which is drawn on the type sheet in the Lindley Herbarium. Examination of the type specimen, however, shows that it is entirely in the fruiting state, and that the fruits are borne on long slender peduncles quite unlike anything to be found in the genus *Luisia*. The flower drawn by Lindley is very similar to that of *M. brachystachys*, the differences pointed out by him being well within the range of variation of the species or easily explicable as a result of different drying.

There appears, therefore, to be a *prima facie* case for thinking that *Mesoclastes uniflora* was based on a mixture, the vegetative parts belonging

to one plant and the flower to another. This view received confirmation from the subsequent discovery of plants agreeing in all details with the type specimen of *M. uniflora* but possessing quite different flowers from that described and drawn by Lindley.

These later specimens were described and figured by J. D. Hooker (see references above) as a species of *Aërides*. But although Hooker recognised their identity with *Mesoclastes uniflora*, which he cited as a synonym, he called the species *Aërides longicornu*, rejecting the epithet *uniflora* as unsuitable in view of the fact that the peduncles were sometimes 2-flowered. The name *Aërides longicornu* is therefore illegitimate under Article 72 of the International Code of Botanical Nomenclature and must be rejected.

There may be doubt, however, as to the legitimacy of the name *Mesoclastes uniflora*. Article 76 of the Code states that "A name of a taxon must be rejected if its characters were derived from two or more entirely discordant elements, unless it is possible to select one of these elements as a satisfactory type." Clearly the proper application of the above article will depend on the meaning attached to "entirely discordant elements". In my opinion (and Mr. J. E. Dandy agrees with me) these should belong to widely separated taxa, such as members of different families. To consider members of allied genera or species within the same genus to be "entirely discordant" would result in the rejection of names of many well-known plants described by early taxonomists from Linnaeus onwards. The genera *Aërides* and *Luisia* are placed in the same sub-tribe of the *Orchidaceae* though they are admittedly not very closely allied within the sub-tribe. They therefore in my opinion do not come within the category of "entirely discordant elements" postulated in Art. 76.

Even if the view is taken that the name *Mesoclastes uniflora* comes within the operation of Art. 76 it is not difficult to typify it from the vegetative portions and infructescences. These are clearly the characteristic part of the species since Lindley's epithet is based on them. Moreover the species can be distinguished readily from its closest allies, *Aërides vandarum* Rchb. f. and *A. cylindricum* Lindl. in the fruiting state. It should also be pointed out that Rolfe was unable to find the flower drawn by Lindley ; there is therefore no material by means of which the name *uniflora* could be typified from the flowers, and it would have to rest on a rather rough pencil-sketch and a very short description.

The most straightforward way of dealing with this problem therefore seems to be to typify *Mesoclastes uniflora* from the vegetative parts and infructescences seen by Lindley, in which case the epithet *uniflora* will have to be adopted in the genus *Aërides* instead of *longicornu* as used by J. D. Hooker and subsequent botanists.

Forestry.*—The current number of Forestry, the Journal of the Society of Foresters of Great Britain, vol. 28, No. 2 (1955), contains a number of papers of interest to ecologists. One is on the occurrence of podzols under deciduous woodland in the New Forest. It appears that on the poor gravels of this area podsolization is a secondary condition and that the natural climax is an oak-dominated forest in equilibrium with a brown forest soil. Another paper considers the influence of weather on the frequency of beech mast years in England. There are significant correlations between the size of mast and July temperature and July sunshine, while spring frosts have a damaging effect on flowers of beech. A comparison is made in another article between the light conditions under fifteen forest plots and five open areas at Bedgebury. Much variation was found from plot to plot and from season to season. In general, the more luxuriant ground floras are found in those plots with greater light penetration of the canopy either throughout the year or in the spring period. A useful account of woody vegetation in Sicily appears under the title " Notes on Forestry in Sicily ".

W. B. Turrill.

* Forestry, vol. 28, No. 2, Oxford : Clarendon Press. London : Cumberlege. 15/- net. 1955.

Forests of France.*—The characteristic English tendency to assume that " things are done better abroad " is to some extent dissipated by this lively, informative book. The forests of France, like those of Britain, have had a patchy history—sometimes receiving protection and care, only to suffer neglect or over-exploitation at a later date. French forestry, in the sense of scientific administration, really begins with the 19th century ; earlier than that we are presented with a confused scene of good intentions frustrated by corruption, greed and disorder. Sometimes the corruption is almost laughable, as when we read that " La Fontaine was made *grand-maître des eaux et forêts* for his literary merits " and that the irrepressible Beaumarchais aspired to the same office, only to be turned down, not for want of qualifications, but for want of breeding !

Nowadays the *Service des Eaux et des Forêts* strives to make amends for past neglect, and Mr. Reed describes in detail some of the splendid work being done in face of economic difficulty (seemingly ever-present in government bodies) and in face of local prejudice, for the *esprit forestier* is by no means universal amongst the French.

Quite apart from its technical value, *Forests of France* is excellent reading ; the photographs are generally good ; and even the least forestry-minded of readers will long to visit many of the delightful places described in this refreshing book.

R. D. Meikle.

* Forests of France by J. L. Reed, London, Faber & Faber, 1954, pp. 296. Pl. 9. 21/- net.

THE BAMBOO-GENERA NASTUS AND CHLOOTHAMNUS.

R. E. Holttum

When studying at Kew the bamboo specimens from the Singapore herbarium, I found one from New Guinea which clearly belonged to the genus Chloothamnus Buse (Oreiostachys Gamble). I made a description of this specimen, and was struck by the peculiar form of the ovary, a character not mentioned by Henrard in his discussion of the genus (Blumea 2 : 60–73. 1936). Noting that Munro included Chloothamnus in Nastus (though conjecturally, as he had not seen a specimen), I examined the Kew specimens of the type species of that genus, discovering exactly the same form of ovary. This led to a consideration of Henrard's discussion of the relationships of Chloothamnus, a subject which involves the assessment of the significance of various kinds of characters as evidence. My conclusion is that the evidence of the ovary outweighs the other evidence discussed by Henrard, and that the Malaysian species of Chloothamnus should be united to Nastus. The reasons for this are set forth in the following paragraphs, after which is given a revised generic diagnosis, a description of the new species from New Guinea, and a list of the Malaysian species of Nastus, with a key showing their principal differences.

The spikelets of the type species of Nastus and Chloothamnus are identical in general structure as seen externally. At the base are several glumes (about 5) of gradually increasing size, and then one perfect floret, the lemma of which is of the same general nature as the uppermost glume, differing only in being a little larger. When one separates the glumes and lemma, one discovers that the internodes of the axis which bears them (the rachilla) are all very short, with no articulations at the nodes. In Nastus the rachilla has, beyond the perfect floret, a rather long slender extension bearing a small rudimentary floret at its tip, this rachilla-extension with its floret being nearly as long as the palea of the perfect floret ; in Chloothamnus the rachilla is not extended beyond the perfect floret. The shape of the palea of the perfect floret is correlated with the presence or absence of a rachilla-extension behind it ; in Nastus the palea is grooved down the back, the rachilla-extension lying in the groove, in Chloothamnus the palea is not grooved, but is only a little bilobed at the tip.

Henrard considers that this difference rules out any close relationship between Nastus and Chloothamnus, suggesting that such resemblance as does exist is due to convergent evolution. But in *Dendrocalamus giganteus* Munro the uppermost floret is sometimes rudimentary, sometimes perfect with no extension of the rachilla beyond it ; in the former case the palea of the uppermost perfect floret is of variable form, sometimes partly 2-keeled, in the latter case it has no keels. In the genus Neohouzeaua A. Camus (which I would unite with Schizostachyum) a rachilla-extension is sometimes present, sometimes not, even in the same species (Gamble in Kew Bull. 1923 : 92). In the species *Schizostachyum biflorum* McClure and *S. grande* Ridl. there are two or more perfect flowers with a very slender rachilla-extension at the apex of the spikelet ; in both species the palea of the uppermost perfect floret is slightly grooved, that of the lower floret(s) deeply grooved to accommodate the rather

thick lower rachilla-internode(s). I suggest that these examples indicate that the presence or absence of a rachilla-extension beyond the last (or only) perfect floret is not a very fundamental character in bamboos, and that the character of the palea of the uppermost perfect floret is closely correlated with the presence or absence of a rachilla-internode behind it.

On the other hand, I suggest that the structure of the ovary is of very fundamental importance, and it is a character which has been insufficiently studied in bamboos. This lack of study is due partly to the difficulty of observing ovary-structure in dried bamboo specimens, and partly also to the lack of abundant material for examination. But it is strange that though the very basis of the classification of bamboos is ostensibly the structure of fruit and ovary, Henrard did not even mention the subject when considering the relationships of Chloothamnus. He pointed out resemblances between the spikelet-form of Chloothamnus and Oxytenanthera, and then ruled out a near relationship because of quite trivial differences, not mentioning the fact that the ovary-structure in the two genera is very different. This is indeed a case where I would consider resemblances of spikelet-form as due to convergent evolution.

My contention then is that the only difference in spikelet-structure between the type species of Nastus and Chloothamnus is a trivial one, and that the close resemblance of ovary-structure in the two far outweighs that difference, so that there is a strong case for uniting the two genera, considering only the species of Chloothamnus admitted by Henrard in 1936. But there is a further connecting link which in my opinion completely bridges the gap, namely the species *Oreiostachys producta* Pilger, which has exactly the spikelet-structure of Nastus but comes from the mountains of New Guinea, within the geographic range of Chloothamnus. Henrard thought the evidence insufficient for the admission of this species as a Chloothamnus, but Pilger's description is very detailed (including the ovary) and I think there can be no doubt that his species is very closely related to the original Chloothamnus. He describes the rachilla-extension as slender, only 7 mm. long, and the palea of the perfect floret as slightly 2-keeled, so that his species is perhaps half-way between the condition of the type species of Chloothamnus and that of Nastus.

The structure of the spikelet in Nastus raises the question of the precise definition of the word *glume* in the description of bamboo-spikelets. There is a gradual transition in size and shape through five stages from the lowest glume to the lemma of the perfect floret. Munro said that the spikelet of Nastus had several flowers, only the uppermost perfect ; thus he would reckon some of the upper glumes (in my sense) to be empty lemmas. But how can one distinguish between an empty lemma and a glume ? One can call the first two glumes, and the rest empty lemmas, but only by analogy with other grasses ; there is no clear difference between the second and third glumes apart from size, and in this there is a gradual change from lowest to highest, so that there is no reason based on size for making the distinction at one point rather than another. I therefore prefer to call all glumes, without prejudice to the idea that in fact the spikelet of Nastus has probably arisen by an evolutionary process of suppression of the lower flowers in the spikelet and consequent reduction in size of the lower lemmas.

Nastus *de Jussieu, emend. Holttum*

Nastus *de Jussieu*, Gen. Plant. 34. 1789.

Chloothamnus Buse in Miquel, Plant. Jungh. 386. 1854.

Oreiostachys Gamble in Proc. Roy. Acad. Amsterdam 10 : 685. 1908.

Slender bamboos ; inflorescence a panicle or raceme of spikelets, usually at the end of a leafy branch, the branches of the panicle in the axils of very small bracts, the upper branches and apex of the panicle bearing single spikelets ; each spikelet consisting of about 5 glumes, each a little larger than the one below it, separated by very short rachilla-internodes, and one perfect floret, with or without a slender extension of the rhachilla beyond it ; lemma of the perfect floret like the largest glume but a little larger, palea grooved on the back and 2-keeled if the rachilla-extension is present, bifid at the apex and not keeled if the rachilla-extension is lacking ; lodicules 3, fringed, unequal ; stamens 6, filaments free, connective not prolonged into an apiculus ; ovary narrowly cylindrical, crowned by a broadly conical appendage much wider than the ovary itself, the appendage bearing 3 slender fimbriate stigmas ; the ovary-appendage persistent at the apex of the fruit.

Type species : *Nastus borbonicus* J. F. Gmelin in Linn. Syst. Nat. Ed. 13, 2 : 580. 1796.

Distribution : Madagascar, Réunion, Sumatra, Java, New Guinea.

The bamboos from South America which have been referred to this genus should be excluded. They are to be regarded as one-flowered species derived by reduction from ancestors different from those of *Nastus borbonicus*. The only one I have examined is *N. barbatus* (Trin.) Munro, which has spikelets not in a panicle, rachilla jointed below the perfect floret, and an ovary quite different from that of Nastus. Munro referred this species to Nastus before he saw a specimen ; after seeing a specimen he made a MS note in his copy of his monograph (now at Kew) stating that the species should in his opinion be placed in the genus Guadua, but he never published this opinion, nor has the transference been made by anyone else.

Malaysian species of Nastus

Nastus elegantissimus (*Hassk.*) *Holtt.* comb. nov.

Bambusa elegantissima Hassk., Plant. Jav. Rar. 42. 1848.

Chloothamnus chilianthus Buse in Miquel, Plant. Jungh. 386. 1854. *Schizostachyum chilianthum* Kurz in Journ. As. Soc. Beng. 39, ii : 88, 1870. (Not *Schizostachyum chilianthum* sensu Gamble in Ann. Roy. Bot. Gard. Calc. 7 : 116, pl. 101. 1896).

Schizostachyum elegantissimum Kurz in Journ. As. Soc. Beng. 39, ii : 90. 1870.

Oreiostachys pullei Gamble in Proc. Roy. Acad. Amsterdam 10 : 685. 1908.

Chloothamnus elegantissimus Henrard in Blumea 2 : 72. 1936.

Distribution : Sumatra and Java. *Chloothamnus chilianthus* was based on a Sumatran specimen which (according to Henrard) does not differ in inflorescence and floral characters from those of Java. If a well-marked vegetative difference should be discovered in the Sumatran

plants, they should be reinstated as a separate species, for which the name *chilianthus* is available.

Nastus schlechteri (*Pilger*) *Holtt.*, comb. nov.

Oreiostachys schlechteri Pilger in Eng. Bot. Jahrb. 52 : 174. 1914.

Chloothamnus schlechteri Henrard l.c.

Distribution : New Guinea.

Nastus productus (*Pilger*) *Holtt.*, comb. nov.

Oreiostachys productus Pilger in Engl. Bot. Jahrb. 62 : 460. 1929.

Distribution : New Guinea.

Nastus obtusus *Holttum*, sp. nov.

Laminae foliorum ramuli floriferi c. 10 cm. longae, 11 mm. latae, ramuli non floriferi ad 30 cm. longae, 2·1 cm. latae. Inflorescentia paniculata, 10 cm. longa, axes breviter et molliter hirsuti, ramuli laterales c. 10, inferiores basi ramosi, spiculas complures ferentes, superiores spiculam unam ferentes ; spiculae 20 mm. longae, glumae lemmaque dorso pilis appressis pallidis vestitae ; glumae 5, ovatae, obtusae, apicem obtusum versus leviter carinatae, internodiis rachillae 0·5 mm. longis separatae ; gluma infima 3 mm. longa (5-venosa), secunda 4 mm. longa (9-venosa), tertia 5·5 mm. longa (15-venosa), quarta 8·5 mm. longa, quinta 14·5 mm. longa ; lemma 17 mm. longum ; palea 18 mm. longa, apice inaequaliter bifida, non carinata ; lodiculae parvae ; ovarium cylindricum, angustum, appendicula tumida sparse hirsuta quam ovarium multo latiora stigmata ferente coronatum.

Type : New Guinea, Rouffaer Rivier, 200 m. alt. leg. *Docters van Leeuwen* no. 10196 in Herb. Singap.

This species is very similar to *N. elegantissimus* from Java, differing chiefly (apart from possible vegetative differences which the specimen does not show) in the obtuse apex of the glumes and lemma, and in the much larger lemma. The rather low elevation at which the specimen was collected is notable (200 m.) ; all other species of the genus are high mountain plants. A second specimen, with spikelets less well preserved but showing the characters of the lemma clearly, has been found among bamboo specimens sent to Kew for identification from the herbarium of the Forest Department, Lae, Papua ; this specimen was collected at 2000 ft. altitude, or 620 m. (Papua, Eilogo, near Sogeri, Central Division, Womersley and Simmonds 7120).

The following key shows the distinctions between the Malaysian species.

Rachilla-extension and rudimentary terminal floret present . *N. productus*

No rachilla-extension

Lower glumes bearing setiform apex longer than lamina . *N. schlechteri*

Lower glumes with short setiform apex

Lemma 17 mm. long, lacking setiform apex . . . *N. obtusus*

Lemma 11–13 mm. long, including setiform apex 1 mm. long *N. elegantissimus*

NOTES FROM THE EAST AFRICAN HERBARIUM : III.

ACANTHACEAE

Justicia fittonioides *Sp. Moore* in Journ. Bot. **16,** 134 (1878).

J. dolichopoda Mildbr. in Notizbl. Bot. Gart. Berlin **12,** 721 (1935).

The identification of *Paulo* 212 by Mr. Milne-Redhead has enabled several other sheets to be named. Although this plant was described from near Mombasa it was formerly unrepresented in the E. A. Herbarium ; it appears to be widely distributed.

Tanganyika. Morogoro District : Nguru Mts., Koruhamba, Nov. 1953, *Paulo* 212 (EA, K) : Mtibwa Forest Reserve Nov. 1953, *Semsei* 1511 EA, K : low growing herb. Lindi District : Rondo Plateau, on floor of closed forest, Nov. 1950, *Bryce* in *Eggeling* 6021 (EA) : "Mbena" (Kimwera) ; Mchinjiri, March 1952, *Semsei* 687 (EA, K) : very common herb 15 cm. tall with white flowers.

Mr. Milne-Redhead gives (*in litt.*) the above synonymy. The species erected by Mildbraed was based on a Schlieben gathering from Lindi district.

B.V.

ANNONACEAE

Notes on the Genus Uvariodendron (Engl. & Diels) R. E. Fries in East Africa.

One of the dominant small trees in parts of the Karura Forest near Nairobi is a small annonaceous tree conspicuous for its drooping young foliage flushed bright red and an incredibly strong smell of aniseed when any part is crushed. The affinities of the plant are obviously with the genus *Uvariodendron* Fries** which was elevated from one of Engl. & Diels' sections of *Uvaria*. The Kenya plant does not match any of Fries' species nor the single species added from Angola since 1930. A study of the plant in the field has shown that Fries' main key character is quite useless. He divides the genus into two groups, one with flowers on the new leafy shoots and the other with them on the old wood or leafless shoots. Flowers may be found on the Kenya species just above ground level on the trunk and on the very youngest shoots as well as anywhere in between. One is tempted to suppose that the same is true for many if not most of the species Fries included in his key which was naturally based on herbarium material alone bearing the usually inadequate field notes. He records two species from East Africa, *U. usambarense* and *U. pycnophyllum*, one in each of his two groups. The latter species has small leaves 15–28 × 2·5–6·5 cm., and flowers on the new shoots ; the other has very large leaves 35–50 × 10–16 cm. and flowers on the old wood. Using Fries' key to the genus and assuming the flowers to be on the young shoots only, the Kenya plant comes near *U. connivens* Benth. Fries but that has carmine petals, several bracts on the peduncles and a thicker fruit. If on the other hand one assumes the flowers to be on the old wood then it comes in the smaller-leaved group and near to *U. letestui* Pellegr. Fries and *U. molundense* (Diels) Fries. It has different leaves and longer peduncles compared with *U. letestui* and smaller flowers than *U. molundense*. It is here described as new.

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* Continued from K.B. **1954,** 43 (1954).
** Acta Hort. Bergiani **10** (1), 51–65 (1930).

Uvariodendron anisatum *Verdcourt* sp. nov. aff. *U. letestui* e desc. pedicellis valde longioribus, foliis majoribus, connectivo haud puberulo differt.

Frutex vel arbor parva ad 9 m. alta ; ramuli griseo-brunnei, longitudinaliter rugosi, lenticellati, internodiis 1·5–3·0 cm. longis. *Foliorum alabastra* aureo-sericea in siccitate. *Folia* juvenilia rubra, pendula, supra nitidissima, subtus appresse pilosa ; folia adulta petiolata, petiolis ± incrassatis usque 7 mm. longis et 3 mm. crassis supra canaliculatis, pilosis ; lamina oblongo-elliptica (vel rare oblanceolata) ad medium latissima, leviter coriacea, supra glabra et nitida subtus obscure appresse pilosa, 8–29·5 cm. longa et 3·4–11·2 cm. lata, ad apicem ± acuta vel obtusa, basi cuneata vel rotundata ; nervus medius subtus prominens supra leviter impressus, nervisque lateralibus 16–21 utrinque leviter prominentibus, arcuatis atque marginem versus anastomosantibus, venis reticulatis. *Flores* ± carnosi e trunco erumpentes vel axillares, solitarii, pedunculis 2·5–3·7 cm. longis ± pubescentibus. *Sepala* 3 reniformia breviter mucronulata, basi leviter angustata ; intus glabra extra pubescentia, saepe ± carinata, margine ciliata 5–6 mm. longa et 7–8 mm. lata. *Petala* 6, biseriata, acuta ; exteriora 3 ovata extra velutina praecipue ad medium, intus glabra vel margine pubescentia, longitudinaliter 6–7 rugosa, 18–23 mm. longa et 11·5–16 mm. lata, basi angusta 4·5 mm. lata ; interiora angustiora, elliptico-obovata 20 mm. longa et 9·5–11 mm. lata basi 2·5 mm. lata. *Torus* convexus 3·5 mm. altus et 7 mm. diam. *Stamina* numerosissima, glabra fere sessilia 2·2 mm. longa, antheris 1·8 mm. longis ; connectivum supra loculos valde dilatatum oblique truncatum, rugulosum, infra loculos leviter dilatatum. *Carpella* 5–11 oblonga ± 4-angulata supra oblique truncata 3·5 mm. longa et 1·5 mm. lata, uniloculata, hirsuta, ovulis 12–16 biseriatis instructa. *Monocarpia* 4–9, cylindrica leviter moniliformia, usque 5·5 cm. longa et 1·8 cm. lata, apice rotundata, caeruleo-nigra, primo brunneo-pubescentia, mox glabra, seminibus usque 12 ovoideis, compressis, pallide brunneis, 11 mm. longis, 9 mm. latis, et 5 mm. crassis instructa.

Kenya. Nairobi District, Karura Forest by Karura stream, 5 miles Nth. Nairobi on Thika Road, 1650 m., 29th June 1952, *Verdcourt* 674 (EA, K) : small branched tree 3·6–4·5 m. tall, abundant in *Rawsonia-Piptadenia* forest, branches brittle, young leaves flushed red, very shining above, pendulous, flowers from main trunk and new shoots, perianth thick, sepals silvery outside, petals velvety brown in bud, creamy inside in open flowers ; fruit :—large clusters of oblong monocarps, very deep grey blue-black ; all parts smell strongly of anisole ; same locality, 24 June 1951, *Verdcourt* 526 (EA, holotype, K & PRE, isotypes) ; same locality 24 December 1950, *Verdcourt* 406 (EA, K, PRE) : tree up to 9 m. tall with 3–5 brittle branches ; fruits and flowers on oldest wood and also on new leafy branches, foliage strikingly rich green and shining ; flowers 2·5 cm. across, tepals thick and brittle like " plaster of paris " and usually with perforations due to insects ; fruits dark olive-green ; same locality, 30 June 1954, *Verdcourt* 1134 (EA, spirit material of flowers and fruits).

(Note : I have also seen the plant with *Heywoodia* sp. in similar *Piptadenia* streamside forest at Thika) ; Karura Forest, 1620 m., 1941, *Bally* 1508 (EA) : shrub or tree in forest near river, up to 4·5 m. tall, crushed leaves scented with aniseed (N.B. The tag label also bears the number 103 and two distinct dates !) ; Kiambu, Waterfall forest (sic), 1650 m., 17 June 1924, *Battiscombe* 1285 (EA, K) : small tree, young leaves bright red, " Mutonga " (Kikuyu) : same locality 1710 m., ?, *Battiscombe* 811 (EA, K) : young leaves copper colour and having pleasant aromatic flavour. Meru District : Lower Imenti Forest, Mbeyu, principal understorey tree in *Lovoa* rain forest, 1170 m., 12 May 1954, *Dyson* 410 (EA, K) : small rather straggling understorey tree, bark smooth grey, leaves shining green, flowers pale yellow borne on stems and lower down on trunk, fruits grey-green.

There are several other gatherings of the genus in the herbarium which may be enumerated here.

Uvariodendron usambarense *R. E. Fries* in Acta Hort. Bergiani **10** (1), 64 (1930).

There is an isotype in the East African Herbarium consisting only of three large leaves. Further sterile sheets from Morogoro which *seem* conspecific show a very characteristic arrangement of the young leaves—there are about 9, folded and arranged distichously, densely buff sericeous and marginally ciliate with long hairs. The whole leaf bud is about 3 cm. long and broad and supported by hemispherical mucronate bracts the whole effect being very similar to an Eragrostis spikelet. The dry leaf buds have a citrol like odour when crushed. The adult leaves are similar in shape to *U. usambarense* but are smaller (18 × 4–28 × 9) agreeing with the description of *U. pycnophyllum*, a species described from Amani but of which no material exists in the herbarium.

Tanganyika. E. Usambaras, Nderema, in dichtem Urwald, 800 m., 26 March 1900, *Scheffler* 226 (EA !, P, B†). Morogoro District, Kimboza Forest Reserve, in swamp forest, July 1952, *Semsei* 773 (EA) : small tree with aromatic leaves, fairly common, " Mkenene " (Kiluguru) ; same locality, Nov. 1953, *Paulo* 163 (EA) : small tree (in young fruit, peduncles up to 2 cm. long).

Further material of both the Usambara and Uluguru plants in fruit and flower is needed and may indicate that they are not conspecific.

Uvariodendron sp. cf. **usambarense.**

A further sheet which has the same native name " Mkenene " is rather different from the Scheffler sheet, though scarcely more so than either of the other two cited with it above. The leaves are 42 × 10 cm., and rather long acuminate, and more narrowed towards the base. At the apex of the branch is a solitary golden sericeous juvenile leaf.

The large leaves of this specimen are however thin and brownish *in sicco* ; it is possible that the entire branchlet was derived from a leaf bud of the form described for *Semsei* 773 since in *Paulo* 163 an entire branchlet is composed of thin leaves certainly derived from the rapid opening of an " Eragrostiform " bud. The monocarps are up to 6·7 × 2·7 cm., shortly sausage-shaped, and the seeds compressed 22 × 12 mm. It must stand close to *U. usambarense*.

Tanganyika. Morogoro District, Liwali River, Manyangu Forest in Sth. Nguru Forest Reserve, 750 m., 21 Aug. 1951, *Greenway* and *Farquhar* 8628 (EA, K) : an openly branched evergreen tree to 12 m. tall with a thin bole, smooth grey-green bark, branches thin spreading and pendent, leaves apple green and very pendent. Flowers cauliflorous, half-way up the trunk, young branches nutmeg scented ; common but scattered in *Cephalosphaera, Strombosia, Allanblackia, Erythrophloeum, Odyendea, Piptadenia buchanamii* evergreen forest on a steep mountain slope in an orange loam derived from gneiss, " Mkenene " (Kinguru), bark used for flavouring food.

Uvariodendron sp.

There is a further species in the Uluguru mountains which also bears the same name " Mkenene " but cannot, I think, be only a variation of the previous species. The leaves are oblong, rounded at both ends, up to 18 × 8 cm., sparsely adpressed pubescent beneath. The flowers are almost sessile on the older wood and the buds which are up to 1·1 cm. in diameter are tightly surrounded by sericeous bracts. The sepals are 1·0 × 1·5 cm. and the petals 2 × 1·4 cm. This species appears to be close to the Kenya species and also to *U. molundense* (Diels) R. E. Fries.

TANGANYIKA. Morogoro District : Turiani, Mtibwa Forest Reserve, Nov. 1953, *Semsei* 1498 (EA, K) : a small tree which bears its flowers on the trunk or branches ; same locality, Aug. 1952, *Semsei* 852 (EA, K) : tall evergreen tree (" to 90 ft." sic !) showing young fruit, sic ! (buds).

It will be seen that there is need for further field work before the species occurring in the Usambaras and Ulugurus can be sorted out. There appear to be three or four of them. For each of these undescribed species and also for *U. pycnophyllum* and *U. usambarense* the following correlated material is needed—young leaf buds, flowers showing entire peduncle and information as to situation, range of leaves showing variation of base and mature fruits. Until these are available it would be foolish to suggest names and affinities in a definite way.

B.V.

BUXACEAE

Notobuxus obtusifolius *Mildbr.* in Notizbl. Bot. Gart. Berlin **12,** 710 (1935).

This species based on *Schlieben* 5818 collected at Lindi in Tanganyika is more widely distributed than was formerly suspected—it is also more variable. *Greenway* 4138 is conspecific with the type but is a form with much more pubescence on the stems and undersurfaces of the leaves (the type is practically glabrous) and leaves a little more diamond-shaped and not so oblong-elliptic as the type. *Dale* 3631 is a better match and is glabrous.

KENYA. Coast Prov. : in scrub forest, N. Giriama Reserve near Adu, Sabaki River, Jan. 1937, *Dale* 3631 (EA, K) : shrub to 1·2 m. with very corky bark, flowers yellow-green " Mdhahabu " (Kiswah and Gir.) " Masere " (Gir.) " Babala (San.).
(Note : also seen at Arabuko and Sokoke fide Dale).

TANGANYIKA. East Usambaras, Kijango, 450 m., 27 Oct. 1935, *Greenway* 4138 (EA, K) : evergreen shrub with green flowers in *Brachylaena*, *Croton*, *Euphorbia* evergreen thicket on red soil, " Kigwande " (Kizigua), roots used as an aphrodisiac.

I am indebted to Dr. Robyns for allowing the loan of an isotype of the species from Brussels.

B.V.

CANELLACEAE

Warburgia ugandensis *Sprague* subsp. **longifolia** *Verdcourt* in Kew Bull. **1954,** 543 (1955).

The specimen cited below arrived too late for inclusion in the reference mentioned. The fruits are a good deal larger than any seen round Nairobi from the nominate subspecies and are perfectly round, attaining 5·5 cm. in diam. All the material has so far been collected from one individual tree. It would perhaps therefore be advisable to await more material from other localities before elevating it to full specific rank. It is possible, but unlikely, that it is an individual variation.

TANGANYIKA. Lindi District, Rondo Plateau, Mchinjiri, Oct. 1954, *Farrer* 2 (EA, K).

B.V.

CELASTRACEAE

Hippocratea holtzii *Loes.* in Die Nat. Pfl. ed. 2, **20b,** 216 (1942) ; T.T.C.L. 248 (1949).

Loesener gives an imperfect description of this species and mentions neither specimens nor locality. There is a specimen in the East African Herbarium which matches the description quite adequately and is I

believe practically certainly a duplicate of the specimen Loesener had before him. It is here selected as a lectotype. A further specimen has since been collected.

TANGANYIKA. No locality given but probably " Sachsenwald " near Dar es Salaam, *Holtz* EAH 7299 (EA, lectotype) ; Usambara Foothills, Kisiwani, in evergreen rain forest, 450 m., 2 May 1939, *Greenway* 5874 (EA, K) : evergreen liane with much branched panicles of small greenish cream flowers ; locally scattered with *Bosqueia phoberos*, *Celtis durandii*, *Combretum schumannii*, *Pachystela brevipes*, on a bright red clayey loam overlying gneiss.

B.V.

FLACOURTIACEAE

Scolopia rhamniphylla *Gilg*, in Engl. Bot. Jahrb. **40,** 484 (1908).

This species has frequently been collected in Uganda but the following may be the first record of the tree from Tanganyika.

TANGANYIKA. Bukoba District : Minziro Forest Reserve, in understorey of semi-swamp evergreen forest, 1400 m., July, 1950, *Watkins* 468 (F.H. 3207) (EA, K) : spiny shrub or small tree up to 6 m. tall, flowers yellow, occasional to locally frequent.

B.V.

GRAMINEAE

Briza minor *L.*, Sp. Pl. 70 (1753).

No specimens of this species have previously been seen from Tropical Africa and the following specimen is probably an escape from cultivation since it is known that various plants were cultivated in the Mission grounds.

TANGANYIKA. Rungwe District, Rungwe Mission, Jan. 1954, *Semsei* 1570 (EA, K).

B.V.

LABIATAE

Leucas nubica *Benth.* in *DC.*, Prod. **12,** 530 (1848).

There do not seem to be any previous records of this plant from Kenya. In the East African Herbarium there is also material from French Somaliland.

KENYA. Turkana, 100 miles north of Lodwar, in lava desert with sparse trees and scrub, 750 m., 22 May 1953, *Padwa* 195 (EA, K) : flowers white ; N.F.P., Dandu, 750 m., 13 May 1952, *Gillett* 13172 (K, EA) : annual with white flowers.

B.V.

LOGANIACEAE

Chilianthus dysophyllus (*Benth.*) *Benth.* in *DC.*, Prod. **10,** 436 (1846).

Although this conspicuous species is already recorded from Tanganyika, the following is the first specimen to be sent to the East African Herbarium during over fifty years of functioning.

TANGANYIKA. Mbeya District, Mporoto Mts., edge of upland forest, 10 Sept. 1954, *Smith* 1279 (EA, K) : climber with white flowers.

B.V.

MELIACEAE

Ekebergia benguellensis *Welw.* ex *C. DC.* in DC., Monog. Phan. **1,** 642 (1878).

TANGANYIKA. Geita District, Rwamgasa, 1200 m., Aug. 1953, *Gane* 63 (EA) : shrub or small tree on light sandy soils in Miombo woodland, " Mutuzia " (Kirongo and Kisumbwa). Apparently not previously recorded from the territory.

B.V.

MELIANTHACEAE

Further Notes on the Genus Bersama Fres.

In 1950 I* took the drastic action of sinking nearly all the Tropical African species of *Bersama* into *B. abyssinica* Fres. at the specific level. No names were validated for any of the varieties. Several years in Africa have not enabled me to improve the imperfect scheme worked out from dried material and the problem must be left to some future investigator equipped to apply the methods of synthetic taxonomy. In preparation for the account of the family for the Flora of Tropical East Africa, the following infra-specific taxa are given names.

Bersama abyssinica *Fres.* in Mus. Senckenb. **2,** 281 (1837) subsp. **abyssinica** var. **kandtii** (*Gilg and Brehm.*) *Verdcourt* comb. nov.

B. kandtii Gilg and Brehm. in Engl., Bot. Jahrb. **54,** 402 (1917).

B. abyssinica subsp. **abyssinica** var. **holstii** (*Gürke*) *Verdcourt* comb. nov.

B. holstii Gürke in Engl., Bot. Jahrb. **19,** beibl. 47, 36 (1894).

B. abyssinica subsp. **paullinioides** (*Planch.*) *Verdcourt* in Kew Bull. **1950,** 237 (1950) var. **usambarica** (*Gürke*) *Verdcourt* comb. nov.

B. usambarica Gürke in Pflanzenwelt. Ost-Africas **C,** 252 (1895).

B. abyssinica subsp. **paullinioides** var. **nyassae** (*Bak. f.*) *Verdcourt* comb. nov.

B. nyassae Bak. f. in Journ. Bot. **45,** 19 (1907).

B. abyssinica subsp. **paullinioides** var. **engleriana** (*Gürke*) *Verdcourt* comb. nov.

B. engleriana Gürke in Engl., Bot. Jahrb. **14,** 307 (1891).

The proof of my Kew Bulletin paper was unfortunately never sent to me and several typographical errors went uncorrected. The most serious of these are as follows :—

p. 243 (and index) for *Bersamide* read *Bersama* (line 11 from bottom).

p. 244 for 1931 read 1913 (line 26).

Dr. Phillips** has ignored my suggestions for sinking large numbers of the Tropical African species. As I have previously pointed out the genus behaves somewhat differently in South Africa and the species are rather distinct. A rapid examination of the material of the genus preserved at Pretoria has however suggested to me that *B. stayneri* Phillips is possibly only a variety of *B. tysoniana* Oliv.—both have very similar tuberculate fruits—and that *B. transvaalensis* Turrill may be a hybrid between *B. tysoniana* and *B. lucens* (Hochst.) Szyszyl. This hypothesis can only be

* K.B. **1950,** 233–244 (1950).

** Genera of South African Flowering Plants, ed. 2, 486–487 Pretoria (1951).

tested in the field. The fruit of *B. swinnyi* Phillips (previously unknown) has silky hirsute protuberances and the following sheet may be cited.

NATAL. Zululand, Ndwedwe, coastal forest, 2 July, 1947, *Acocks* 13796 (PRE, EA) : tree to 6 m.

In conclusion I might add that I can see no reasons why the genus should be excluded from the Sapindaceae.

B.V.

MOLLUGINACEAE

Psammotropha myriantha *Sond.* in *Harv.* and *Sond.*, Flora Cap. **1,** 147 (1859) ; Hauman in Fl. Congo Belge **2,** 112 (1951).

This genus does not appear to have been recorded for East Africa, but occurs in the Katanga. The Elton Plateau is a very unexplored part of Tanganyika and doubtless will yield some very interesting plants when further investigated.

TANGANYIKA. Njombe District, North Ukinga, Elton Plateau, on rock outcrops, 2610 m., May 1953, *Eggeling* 6618 (EA, K) : flowers buff ; same district, Ndumbi Forest, March 1954, *Paulo* 291 (EA, K) : very common plant.

B.V.

MORINGACEAE

Moringa peregrina (*Forsk.*) *Fiori* in Agric. Colon. **5,** 59 (1911) ; Dale, Indigenous Trees of Uganda, ed. 2., 265 (1952).

There was little previous material of this species in the East African Herbarium and the tree does not appear to have been recorded for Kenya.

KENYA. Turkana District, Lodwar, in riverine forest by R. Turkwell, 480 m., 1 July 1954, *Hemming* 275 (EA, K) : tree to 12 m. with smooth white bark, wood very soft, flowers pale yellow, with *Hyphaene*, *Acacia*, and *Salvadora*.

B.V.

MORACEAE

Ficus stipulifera *Hutch.* in Kew Bull. **1915,** 326 (1915).

I am indebted to the Forest Dept., Entebbe for the loan of an isotype of this species which enabled the naming of the following new record to be confirmed.

TANGANYIKA. Bukoba District, Munene Forest Reserve, 1140 m., 2 Feb. 1954, *J. Benedicto* 5 (EA) : tree to 6 m., fruits green.

B.V.

RANUNCULACEAE

Ranunculus sceleratus *L.*, Sp. Pl. 551 (1753) ; Staner and Léonard in Fl. Congo Belge **2,** 174 (1951).

This species was found mixed up with a specimen of *Ranunculus multifidus* Forsk. and had been collected unwittingly. It is not included in the Flora of Tropical East Africa : Ranunculaceae (1952). I am indebted to Mr. Milne Redhead for confirming my suspicions that the plant was indeed the common European one. It is known also from the Kivu area of the Belgian Congo.

TANGANYIKA. Northern Prov. : Masai District, Geitokitok Springs in Ngorongoro .Crater, in marsh vegetation, Feb. 1954. *Eggeling* 6801 B (EA).

B.V.

RUBIACEAE

Burttdavya nyasica *Hoyle* in Hook., Icon. **34,** 3318 (1936).

This distinctive shrub has been known from Tanganyika for some considerable time but has not been collected until recently nor has it previously been officially recorded outside of Central Africa.

TANGANYIKA. Handeni District, 1953, *Yusuf Mohamed* H 117/53 (EA) ; Kilosa District, Kidodi, 360 m., Oct. 1951, *Eggeling* 6304 (EA, K) : tree to 21 m. with habit of a *Pycnanthus*, mature leaves mostly about 20 cm. long, nerves very prominent below, wood bright yellow, stipules green ; Vigude, Oct. 1952, *Semsei* 944 (EA, K) : "Muhalumwa " (Vidunda). Morogoro District : Kimboza Forest Reserve, in moist situations in lower rain forest type, 300 m., 11 July 1946, *Yusuf Kambi* F.H. 1814 (EA) : occasional very big tree (sic), timber a striking golden orange or greenish colour, works and finishes well (also seen at Msawero—R. Wami Forest).

B.V. and P.J.G.

Conostomium camptopodum *Brem.* in Verhandl. der Kon. Akad. Wetensch. Afd. Nat. (2) **48,** 133 (1952).

KENYA. Turkana District, Katesuk, sandy plain, 900 m., 1 May 1954, *Popov* 1535 (EA, K) : erect herb with white flowers, growing in gravelly rises.

B.V.

Gardenia posoquerioides *Sp. Moore* in Journ. Linn. Soc., Bot. **40,** 81 (1911).

KENYA. Coast Prov. : Rabai, 300 m., August 1937, *van Someren* 313 (EA) ; Makadara, Shimba Hills, forest floor in large forests, July 1939, *van Someren* Sh 79 (EA).

TANGANYIKA. Morogoro District, Mtibwa Forest Reserve, Aug. 1952, *Semsei* 919 (EA, K) : small tree 4·5–6 m. tall, pulverised roots used to cure chest complaints, "Pingwe" (Kinguru).

This is one of several species and genera (e.g. *Grevea* spp. nov.) common to the Uluguru area and Kenya coastal forests. One of us compared the specimens with the type at the British Museum.

B.V. and P.J.G.

Oldenlandia aegialodes *Brem.* in Kew Bull. **1953,** 438 (1953).

Erratum : the citation *Greenway* 5236 should read *Greenway* 5216.

B.V.

RUTACEAE

Citropsis schweinfurthii (*Engl.*) *Swingle* and *Kellerman* in Journ. Agric. Research **1,** 426 (1913).

Limonia ugandensis Bak. f. in Journ. Bot. **45,** 61 (1907).

TANGANYIKA. Bukoba District : Minziro Forest, Oct. 1953, *Parry* F (EA) : shrub to 1·8 m.

Mr. Parry's specimen was not collected as a botanical specimen but merely for interest in the name. It is obvious that nothing must ever be assumed to be well-known since the plant in question is not recorded from Tanganyika.

B.V.

SAPINDACEAE

THE GENUS CHYTRANTHUS Hook. f. IN EAST AFRICA.

Among the many interesting plants collected by Dr. Eggeling during his period of service in Tanganyika is a small Sapindaceous shrub up to

5 ft. tall with long " racemes " of flowers originating from the old stem mostly *below* ground level. The fruits are large, three-lobed and fleshy, their weight causing the inflorescence to lie flat on the ground. Further material was later collected, both in Tanganyika and Kenya, by Messrs. Hemsley and Drummond. The plant on dissection proved to belong to the tribe Lepisantheae and to come near to the genera *Glossolepis* and *Chytranthus*. The structure of the petals does not fit the existing descriptions of either genus. Exell* (1928) (and *in litt.*) suggests that there is no real distinction between *Glossolepis* and *Chytranthus*. These genera have been separated by the number of stamens and by the shape of the petal scale. Exell points out that the number of stamens is intermediate in some species and that the scales are very similar. He does however admit that there is an accessory crest to the scale in *Glossolepis*. I find that this is present in many species of *Chytranthus* and would sink the two genera into one without hesitation. I have examined a few species of the genus but insufficient to divide the genus into sections. It is likely that classification on the basis of petal scales alone would result in groups very heterogeneous as to other characters. The classification employed by Radlkofer** in his monumental revision of the world's Sapindaceae (1932) is very artificial in part though it is likely that his primary grouping by means of the number of ovary-locules is natural. In *C. carneus* and *C. gilletii* the scale is simple, emarginate and attached along a median line and part of the base. In the material dissected the flowers were hermaphrodite. In *C. obliquinervis* there is an obovate scale the upper margins of which are curved outwards and there is a distinct emarginate subsidiary crest behind the scale. In some material (the Amani specimens) the flowers were found to be male but in others (Morogoro specimens) the flowers proved to be truly hermaphrodite. In *C. klaineanus* the petals and petal scales are narrow and are joined only along the median line. There is a broader fimbriated crest behind the scale. The shape of the scales is therefore extremely variable and of no generic value. Radlkofer records only one species of *Chytranthus* from East Africa, *C. obliquinervis* and of that he had such poor material that he could not put it into his key nor give a full description of it. I have seen several sheets including some from near the type locality which I would refer to this species *e descript.* There are a few other species which have been collected in East Africa but they are represented by inadequate material at present. These species are enumerated below.

1. **Chytranthus obliquinervis** *Radlk.* in Engl. Pflanzenreich **IV, 165,** 797 (1932).

The material cited below from the Ulugurus seems to be conspecific with topotypic material from the Usambaras but the material is at different stages of growth. Further complete material is needed from both localities. The material does not agree in every detail with Radlkofer's description. The flowers are brown *in sicc.* and green in bud and not in any way " carneo–tomentosa " or " fusco–lilacini ". Radlkofer's information is that of the original collector and refers to living material. The branches of the inflorescence are 10–22 cm. long and not 5 cm. but

* Journ. Bot. Suppl. 1, 86 (1928).
** Das Pflanzenreich IV.165, 782 ff (1932).

Radlkofer's material was in young bud. These differences are rather unimportant and the rest of the description fits well. The following additional information may be given.

Tree to about 6 m. tall. Leaves large up to 14-jugate. Leaflets 18–40 cm. long and 6–11·5 cm. broad. Lateral nerves 10–25. Inflorescence branches 4–22 cm. long, bracts 8 mm. long. Flowers male or hermaphrodite (on different plants). Calyx 7·5 mm. long, the largest lobe 6 × 3 mm. and the smallest 5 × 1 mm. with expanded margins 0·75 mm. wide on either side. Petals 7 mm. long and 2·5 mm. wide. Stamens about 7, filaments 2 mm. long, anthers 2 mm. long unappendaged at the apex. The filaments are attached to the anthers at about a fifth of the way up from the base. The petal scales have been described above. Disc 3 mm. long and 1 mm. thick. Ovary three-locular, 3 mm. tall and 3·5 mm. broad, style 4 mm. long, stigma 1·5 mm. long. Ripe fruits not seen.

Using Radlkofer's key as it stands it will run to species 22–24 but it is not close (*e descr.*) to any of them. His statement that *C. obliquinervis* is allied to species 2 is not correct since that has a six-locular ovary.

Tanganyika. E. Usambaras, Derema in silva primaeva, 800–900 m., Jan. 1900, *Scheffler* 185 (B†, holo.). I have not seen any isotypes and it is possible that none exists. In that case *Greenway* 6444 could be designated neotype since it comes from very near the type locality : Amani–Monga, 900 m., 4 Feb. 1942, *Greenway* 6444 (EA, K) : a slender unbranched tree up to 6 m. tall crowned with a tuft of long imparipinnate leaves ; inflorescence of clustered racemes (sic) of inconspicuous green flowers (actually buds) produced in the axils of the old leaf scars up the stem ; rare in *Parinari*, *Piptadenia*, *Allanblackia*, *Cephalosphaera* evergreen rain forest. Magila, 7 April 1923, *Soleman* AH 6183 (EA) ; Morogoro District, Turiani, Mhondo Mission, Nov. 1953, *Semsei* 1402 (EA, K) : a small tree which bears its fruit on the trunk near the ground and lower portions of the branches (in young fruit).

2. **Chytranthus** sp. nov.

Insufficient material is available for adequate description. The leaves are large and more than 3-jugate, leaflets large up to 38 × 14 cm., oblong-elliptic, the sides smoothly rounded, glossy above and shortly bristly pubescent below ; lateral nerves about 18. Branches of inflorescence up to 15, about 18 cm. long. The buds are crimson pubescent *in sicc.* The anthers are simple and not terminated with glands. The petal scales are broadly obovate and ecristate, adnate at the base and along the median line. The crest is represented by a slight thickening behind the scale. The specimen is male and there is no rudimentary ovary. Until female flowers have been collected the true position of this plant will not be known. If more than 3-locular then its affinity is with *C. brunneotomentosus* Gilg ex Radlk. *e desc.* but that appears to have narrower oblong leaves, different scales and a rudimentary ovary in the male flowers. It does not seem to agree with any of the species in the group with 3-locular ovaries.

Tanganyika. Bukoba District : Kikuru Forest, 1936, *Gillman* 447 (EA, K) : medium tree in forest on periodically inundated grey clay loams.

3. **Chytranthus sacleuxii** *Pierre & Sacleux* in Bull. Mus. Hist. Nat. Paris (2) **6,** 110 (1934) subsp. **longiflorus** *Verdcourt* subsp. nov. planta typica petalis 7 mm. longis et 1·5 mm. latis (nec 3·6 × 1 mm.), longe (nec breviter) unguiculatis, filamentis 5 mm. (nec 2 mm.) longis valde differt.

Frutex parvus, erectus, usque 1·5 m. altus, non vel parcissime ramosus ; caulis glaber, dense lenticellatus, leviter rugosus usque 2·2 cm. diametro regione radicifera, superne 1·5 cm. diametro, griseo-brunneus, ramis juvenilibus puberulis ; internodia 2–6 cm. longa. *Folia* paripinnata (vel pseudo-imparipinnata) 17–50 cm. longa, 3–6-juga, rachi breviter brunneo-puberula, petiolo usque 15 cm. longo ; foliola opposita vel alterna utrinque glabra et nitida, supra plumbeo-viridia subtus viridia, oblanceolata, obovato-lanceolata vel elliptico-oblonga, basi cuneata, rotundata vel leviter cordata, apice acuminata, acumine obtuso vel leviter acuto, 7·5–32 cm. longa, 2·9–11·5 cm. lata, petiolulis brunneo-hirsutis ± incrassatis, 6–8 mm. longis. *Nervis lateralibus* utrinque 9–16 subtus prominentibus, patulis, ante marginem adscendentibus et anastomosantibus, venulis reticulatis. *Inflorescentiae* pseudoracemosae brunneo-puberulae saepissime e trunco subterraneo ortae, 4·5–28 cm. longae, pedunculis usque 7·5 cm. longis, floribus in cymulas numerosas (usque 50) 3–5-floras dispositi, pedunculis secondariis, bracteis et bracteolis minutis ; alabastra ellipsoidea griseo-tomentosa. *Calycis tubus* oblique cylindricus, breviter et dense pilosus, 5·5 mm. longus et 3 mm. latus, lobis inaequalibus, acutis, 1·5 mm. longis et 0·75–1·75 mm. latis. *Petala* 4, glabra, anguste unguiculata, ungue lineari 2·5 mm. longo et 0·75 mm. lato ad apicem margine leviter ciliato, lamina elliptico-oblonga 5·3 mm. longa et 2 mm. lata apice lobulata, margine crenulata ; intus squama ecristata basi ubique adnata, apice bilobata, lobis simplicibus deltoideis 0·5 mm. longis 1–2 aucta. *Discus* semilunaris unilateralis intus planus extra tricrenulatus, inter petala et stamina expansus. *Stamina* 7, filamentis 3–5 mm. longis superne angustis, antheris innatis, introrsis, 1·5 mm. longis, glabris vel ± pilosis, thecis apice appendicibus subglobosis hyalinis, 0·2 mm. longis ornatis. *Ovarium* ellipsoideum, 3-loculare, triquetrum, 2·5 mm. longum et 2 mm. latum ; stylus conicus, apice stigmatoso clavato, sulcato, 2·5 mm. longo et 1 mm. lato ; ovula in loculis solitaria hilo longitudinalis angulo centrali affixa. *Inflorescentiae* in statu fructifero prostratae. *Fructus* carnosus glabrescens, flavido-brunneus, triquetro-subglobosus, trilobatus, 3·6 cm. altus et 3·8 cm. latus, lobis margine acutis, apice ± acuminatus, basi ± rotundatus. *Semen* ellipsoideum a lateribus valde compressum, supra leviter depressum, basi obtusum, 15 mm. longum, 10 mm. latum, et 5 mm. crassum, hilo lineari 9 mm. longo, lamellis ligulatis crenulatis dense obtectum (in statu sicco scrobiculatum).

Tanganyika. Kilosa District, Kidodi, in forest undergrowth, 360 m., Oct. 1951, *Eggeling* 6306 (EA, K) : woody plant 0·3–0·6 m. tall resembling seedling or small sapling of forest tree, flowers white ; Morogoro District, Lusunguru forest reserve near Mtibwa sawmills, 4 miles N. of Turiani, 500 m., 31 March 1953, *Drummond* and *Hemsley* 1937 (K, holotype of subsp., EA, isotype) : small shrub from 30 cm. to 1·5 m. tall in the field and shrub layer of groundwater forest, inflorescences arising from below ground level or a few cm. above ground level ; calyx dark green, corolla cream, stamens cream ; Morogoro, undergrowth in forest beside stream, 540 m., Jan. 1954, *Eggeling* 6778 (EA, K) : woody plant which looks very like a juvenile tree, 1·5 m. tall, fruits fleshy indehiscent, orange ; inflorescences arising mainly from below soil level, one only from about 0·3 m. up the 1·8 cm. diam. stem ; the weight of the fruits weighs down the rachis until it lies on the ground (spirit material at EA and K) : ditto, in miombo woodland in fairly long grass, near a stream, 540 m., Jan. 1954, *Eggeling* 6779 (EA) : small woody plant 0·6 m. tall, flowers white.

Kenya. Kwale District, near Shimoni, c. sea level, 20 Aug. 1953, *Drummond* and *Hemsley* 3926 (EA, K) ; shrub to 1 m. in shrub layer of coastal forest on coral rock, flowering from below ground level ; calyx pale green, corolla, anthers, filaments and style cream.

The leaflets are usually quite glabrous but there are sometimes a few sparse hairs on the costa below. The second pair of leaflets from the top of the leaf are largest and often three times the size of the last pair. Although the majority of the inflorescences arise from below ground level a few sometimes leave the stem at up to one foot above ground level. The calyx lobes are unequal, two medium-sized teeth more or less connate, one small tooth and two larger lateral ones. The petals alternate with the sepals and the stamens are inserted opposite to the petals. The petal scales are variable according to the petal concerned, entirely adnate to the claw and extending a little way on to the lamina, 1–2 lobedat the apex. In addition to the central lobes which are about 0·5 mm. long there are two lateral lobes which are adnate to the edge of the base of the lamina.

This plant was at first believed to represent a distinct new species since it did not agree with any described species. Since however the description of *C. sacleuxii* indicated a plant of very similar habit it was thought advisable to examine authentic material of that species. A search of the only partially sorted Vaughan Zanzibar collection in the East African Herbarium yielded a sheet containing a solitary inflorescence. This sheet is however an exact topotype of *C. sacleuxii* since it was collected at the Kombeni cave-well (small shrub on coral rag, 11/12/1935, *Vaughan* 2307). An examination of the flowers showed that there were 5 petals with very short claws, quite different from the mainland form. The scale also seemed to be different. Further material was necessary in order that these conclusions might be checked. Prof. Humbert very kindly sent three sheets on loan from Paris—*Sacleux* 1012 collected in Zanzibar in 1889 ; the label says shrub to 1·5 m., flowers white, sometimes tinted violet brown. One of the sheets has the word " type " written on it. A study of the description indicates that seeds (*Sacleux* 521) were grown at Paris and the resulting cultivated plant is the true holotype. Moreover, the fruit is described in the description but unfortunately is not represented by *Sacleux* 1012. These sheets do however allow the problem to be cleared up. One sheet bears very young thin leaves ; the rachis and truncate, mucronate leaflets are conspicuously pubescent. Another sheet bears several inflorescences, the longest attaining 25 cm. with a peduncle 5·5 cm. long. The third sheet bears an adult leaf which has dried brown and not the leaden grey-green colour of the mainland form. The midrib and petiolules retain some hairs. The largest leaflet measures 24·7 × 8·3 cm. and has ± 16 lateral nerves. The habit of this Zanzibar plant is precisely identical with that of the mainland and the first impression is that the two plants are identical. Examination of the flowers shows that there are considerable differences. Unlike *Vaughan* 2307 there are 4 petals but they are similarly short, 2–3·6 × 1 mm. and the claw is very short, about 0·5–0·75 mm. long. There are 7–8 stamens, the filaments being 2 mm. long and the anthers 1·1 mm. long. The petal scales also differ. In the Zanzibar plant the scale is ± bifid or entire and inflexed ; there is a very narrow horn-like crest at the back. These differences might be thought to be specific in character but the similarity in habit is striking. Ripe fruits in spirit are needed of the Zanzibar plant and these may indicate more marked differences. Until then the two are best considered as only subspecifically different.

The distribution of *Chytranthus sacleuxii* subsp. *longiflorus* is another link between the floras of the southern Kenya coastal forests and the Uluguru forests. Other highly peculiar plants in common are the genus *Grevea*, *Gardenia posoquerioides* and *Uvariastrum* sp. nov.

Two other species from Eastern Africa represented by *Sampson* 50 (Baumo, Tana R., Kenya) and *Swynnerton* 178 (Gazaland) are almost certainly undescribed but the material available is inadequate for description. The former species is a tree to about 5 m., the petal scales are entire and obovate and there is a two-lobed crest behind. The Rhodesian species has very small leaves ; the sepals are almost free and the petals have scales which form " auricles " at the junction of the claw and lamina ; the generic placing is uncertain.

I am indebted to the Director, Royal Botanic Gardens, Kew, for the loan of numerous sheets of the genus and also to the Keeper of Botany, British Museum (Nat. Hist.) for the loan of his duplicate of *Vaughan* 2307 (unfortunately, just as poor a specimen as that in the East African Herbarium).

*STERCULIACEAE

Cistanthera holtzii *Engl.* in Engl., Bot. Jahrb. **39,** 578 (1907).

The following sheet may be nominated neotype. The holotype (*Engler* 3960 (B) almost certainly had no duplicates.

TANGANYIKA. Eastern Prov. : Kiserawe District, June 1954, *Semsei* 1751 (EA, K) : shrub with yellow flowers.

Sterculia tragacantha *Lindl.* Bot. Reg. t. 1353 (1830).

This tree is not recorded from Tanganyika and an additional Congo sheet is also cited. Gum tragacanth is a valuable article of commerce but it is not known how much is available at Kasulu.

TANGANYIKA. Kasulu District, Heru Juu, in relict forest, 1650 m., July 1951, *Eggeling* 6200 (EA, K) : tree to 12 m., fruits clustered containing a gum apparently soluble in alcohol ; three clusters were placed in two pints of pickling fluid and two days later the whole can was syrupy and full of gobs of gum ; same district, Kasulu Highlands, Buyenzi, 9 Sept. 1954, *Rose* 2 (EA, K) : large tree, " Mukungwe " (Kiha).

BELGIAN CONGO. Hombo, Kavumu–Walikale, ± km. 128, edge of tropical forest, 900 m., Aug. 1946, *Hendrickx* 4155 (EA, BR, YANGAMBI, MULUNGU) : tree to 15 m., " Mpimba " (Kitembo).

THEACEAE

Before this family can be satisfactorily worked up for the Flora of Tropical East Africa further material of *Adinandra* is needed from a wide range to elucidate the variation. Material coming into the East African Herbarium during the past year is sufficient, however, to show that *A. greenwayi* Verdcourt and *A. intermedia* Boutique and Troupin are merely forms of *A. schliebenii* Melch. *A. mannii* Oliv. which incidentally is represented at Kew merely by the type and one other sheet is quite distinct by its slightly muriculate stems. *A. greenwayi* was described from the Pare Mountains in Nth. Tanganyika and was said to differ from *A. intermedia* (known from the Belgian Congo, Uganda and W. Usambaras)

*Capuron suggests that *Cistanthera* is identical with *Nesogordonia* Baill. in Not. Syst. **14,** 258–263 (1953).

by having a ferruginous tomentum on the undersurface of the leaves which finally becomes much reduced to a band on either side of the midrib. Three further lots of material have since been collected in the W. Usambaras. *Procter* 183 is *entirely glabrous* including both ovary and style and has pedicels about 2·25 cm. long and leaves 9 × 2·6 cm. *Greenway* and *Parry* 8740 is hairy but not so hairy as the type of *A. greenwayi*, the ovary and style base are pilose, pedicels about 2·5 cm. long and leaves up to 14 × 5·6 cm. with traces of orange tomentum at sides of the midrib. *Hughes* 203 has a pilose ovary and style, the hairs extending far up the base of the style ; the pedicels attain 3·75 cm. The leaves are 11 × 3·8 cm. and are persistently and densely velutinous below. All these specimens have however a common facies and are conspecific. The names can be kept for the extremes of variation but further collecting may show that even these are better dropped.

Adinandra schliebenii *Melchior* in Notiz. Bot. Gart. Berlin **11,** 1076, 1097 (1934).

var. **schliebenii.**

Tanganyika. Uluguru Mts., Bondwa Peak, in upland rain forest, 1900 m., 23 March 1953, *Drummond* and *Hemsley* 1766 (K) : tree to 10 m. with straight clean trunk ; calyx brownish-green, corolla soon drops away, orange with yellow tips to the lobes ; codominant with *Podocarpus* and low growing *Ocotea*.

var. **greenwayi** (*Verdcourt*) *Verdcourt* comb. nov.

Adinandra greenwayi Verdcourt in Kew Bull. **1953,** 84–5 (1953).

Tanganyika. Lushoto District, Shume-Magamba Forest on Shume Road just beyond Grewals Mill, 1920 m., 15 July 1954, *Hughes* 203 (EA, K) : tree to 15 m., top broken, small compact crown, bole straight and cylindrical, about 10·5 m. to crown and 0·3 m. diam. " Msambu " (Kishambaa). Same locality, Shume, in evergreen rain forest, 2100 m., 25 Aug. 1952, *Greenway* and *Parry* 8740 (EA, K) : tree to 24 m. with rough reticulate bark like an *Ocotea*—stems sometimes solitary and sometimes 2–3 together producing stilt roots at about 0·9 m. above ground level and coppicing freely from thick surface roots ; flowers orange yellow with a darker calyx collected from the ground from several individuals ; rare, a small stand of about 5 specimens with *Ocotea*, *Podocarpus* and *Ficalhoa*.

var. **intermedia** (*Boutique* and *Troupin*) *Verdcourt* comb. nov.

Adinandra intermedia Boutique and Troupin in Bull. Jard. Bot. Brux. **20,** 62 (1950).

var. **glabra** *Verdcourt* var. nov. ab planta typica ovario glabro differt.

Tanganyika. Lushoto district, W. Usambaras, Shagayu Forest, 2220 m., May 1953, *Procter* 183 (EA, holotype of var.) : tree to 12 m. but often smaller, flowers orange red ; common in drier parts of forest and on most exposed ridge tops ; same locality, Shagayu Peak, Shagai Forest, 2230 m., 15 May 1953, *Drummond* & *Hemsley* 2536 (K) : small much branched tree to 6 m., calyx deep red, petals orange with yellow or greenish-yellow tips, anthers brownish-yellow, styles and stigma green ; in stunted forest on exposed ridge on summit of mountain with *Podocarpus*, *Schefflera*, and *Syzygium*.

I considered extending the scope of var. *intermedia* to include plants with glabrous ovaries but bearing in mind the fact that the area of the W. Usambaras concerned has produced some peculiar (as yet undescribed) endemics it seems possible that the glabrous ovary may be correlated with a limited distribution.

KEY TO AFRICAN ADINANDRA SPECIES AND VARIETIES.

1 { Shoots roughened (S. Tomé) . . . . . *A. mannii*
  { Shoots almost smooth 2

2 { Ovary glabrous . . . . . *A. schliebenii* var. *glabra*
  { Ovary pilose 3

3 { Leaves pubescent to velutinous below . *A. schliebenii* var. *greenwayi*
  { Leaves glabrous entirely 4

4 { Inner sepals ± pubescent outside . . *A. schliebenii* var. *schliebenii*
  { Sepals glabrous outside . . . . . *A. schliebenii* var. *intermedia*

A good deal of further collecting is needed to show whether or not this scheme is sound and I appeal to foresters to collect every *Adinandra* they see.

UMBELLIFERAE

Peucedanum canaliculatum *Verdcourt* in Kew Bull. **1954,** 40 (1954).

Since describing this species I have seen a further sheet of it from Kenya thus extending the range of the species considerably. Through the kindness of the Agricultural Department, Nairobi, this sheet has been transferred from their herbarium.

KENYA. Nairobi District : Ngong Hills, 13 June 1954, *Ryan* 1065 (EA) : herb to 0·9 m., flowers white.

VERBENACEAE

Clerodendrum scandens *Beauv.*, Fl. Owar. **2,** 6 t. 62 (1806).

TANGANYIKA. Kasulu District : Heru Juu, edge of valley thicket, 16 Aug. 1954, *Smith* 1232 (K, EA) : climber with slightly ridged stems and white and mauve flowers.

The occurrence of this species in the Western Province of Tanganyika was to be expected from its known range.

ZYGOPHYLLACEAE

Fagonia bruguieri *DC.* in DC., Prod. **1,** 704 (1824).

This genus does not appear to have been recorded from East Africa.

KENYA. Magadi, golf course on E. side of the lake, 11 March 1951, *Greenway* 8509 (K, EA, PRE) : spiny bush 0·3 × 0·6 m. with woody tap root ; stems and branchlets yellow-green, flowers small with pale pinkish-purple petals, fruits 3-lobed ; common but scattered in very grey powdery soil with *Aristida*.

The material was named by comparison with a named sheet collected in Somaliland Protectorate and distributed from Kew. A study of the literature has, however, left me extremely unsure as to what name really should be applied to the plant. From descriptions it would appear to be *F. arabica* L., but I feel that those botanists who sunk these two and all related " species " into *F. cretica* L. will prove to be correct. The main characters of leaf shape and spine size vary on a single shoot.

Drawings of British Plants.*—Part VIII of this notable series comprises about one half of the British *Rosaceae*, and includes illustrations of such large and intricate genera as *Prunus*, *Potentilla* and *Rubus*. Miss Ross-Craig has compromised with the Brambles, selecting fourteen "species" from the subgenus *Eubatus*, each chosen to illustrate the characteristics of a well-marked "group" or subdivision of *Rubus fruticosus* aggr. Whether such a compromise will prove acceptable to the batological world remains to be seen, but it certainly commends itself to those of us who view the *Rubi* with limited enthusiasm. To lump all the Brambles into *Rubus fruticosus* has never been a very satisfactory policy, and many non-specialists should now be able to recognize and identify at least some of the major subdivisions of this unruly aggregate. Apart from taxonomic considerations, the *gourmet* will rejoice to see so many pages adorned with such luscious, tempting Blackberries. All the drawings are admirable, but these juicy drupelets are superb !

R. D. Meikle.

* Drawings of British Plants, part VIII Rosaceae (1), Stella Ross-Craig. London : G. Bell & Sons Ltd., 40 plates ; price 8/6 net.

Background to Beekeeping.*—Plant nectar has sometimes been referred to as the raw material of the honey industry. Plants that produce nectar in a manner accessible to the hive bee are of course essential to beekeeping in whichever part of the world beekeeping may be practised.

This book is an elementary beekeeping manual, intended as the author states, for beginners or those about to take up beekeeping as a hobby in the British Isles. It is written in a simple but pleasing style and should prove very helpful to any beginner—adult or child. The suggestions for further reading are a useful feature of the book.

The first chapter entitled "the sweets we seek" is devoted to nectar and honey and to bee pasturage in Britain. There are brief notes on the major nectar or honey plants and the kinds of honey they yield. A short section is devoted to bee gardens with suggestions for planting with both herbaceous and woody plants.

F. N. Howes.

* By A. C. Waine. Pp. XI + 120 illus. W. H. & L. Collingridge Ltd., London, 1955. Price 15s. net.

NOTES ON AFRICAN ASCLEPIADACEAE* : VII.

A. A. Bullock

In this contribution I have resuscitated the name *Pleurostelma* Baill. which had been replaced by the later *Microstephanus* N. E. Br. without any apparent justification. *Pleurostelma* Schltr. is a later homonym which has been replaced by *Schlechterella* K. Schum. (see Kew Bull. **1952,** 359 : 1952). I have also re-established the genera *Conomitra* Fenzl and *Odontostelma* Rendle, both of which seem to me to be amply distinct from *Glossonema* Decne. and *Schizoglossum* E. Mey. respectively, with which they have been united.

The greater part of this paper is occupied with a revision of the genus *Glossonema* Decne., but I have added notes on species of *Pentopetia*, *Trachycalymma*, *Cynanchum*, *Tylophora*, and *Ceropegia*.

The study of *Ceropegia* is much handicapped by the paucity of adequately annotated and well-prepared material. Flowers at all stages of development, preserved in spirit and carefully pressed, leafy stems, the rootstock and fruits are required, together with full habit and habitat notes, and flower colour before and after anthesis ; information as to abundance is also necessary and observations concerning pollination and the possibility of polymorphism would probably lead to the solution of many very puzzling taxonomic problems.

Pentopetia *Decne.*

By the removal of *Pentopetia natalensis* Schltr. from this genus (Bullock in Kew Bull. **1954,** 362 : 1954), the published records show that it is confined to the Mascarene Islands. Decaisne described the genus (in DC. Prodr. **8,** 500 : 1844) with three new species, all from Madagascar,— *P. androsaemifolia*, *P. gracilis* and *P. cotoneaster*.

Of these, *P. gracilis* (which I have not seen) is apparently no more than an extreme form of the very polymorphic *P. androsaemifolia* and it is clear that a lectotype should be chosen from the other two species. Both have formed the subject of long discussions by Costantin and Gallaud (in Ann. Sc. Nat. Sér. 9, **6,** 335-50 : 1907) and by Choux (in Ann. Mus. Col. Marseille, Sér. 3, **2,** 221-235 : 1914), and a number of infra-specific taxa have been described.

There seems little to choose between *P. androsaemifolia* and *P. cotoneaster* in regard to typification and I have selected the former species as lectotype of the generic name :—

Pentopetia androsaemifolia *Decne.* in DC. Prodr. **8,** 500 (1844), lectotypus nominis generici.

P. reticulata Jum. et Perr. in Ann. Mus. Col. Marseille, Sér. 2, **6,** 167 (1907).

A number of additional species have been described and a specimen of *P. androsaemifolia* Decne. labelled " *Pentopetia africana* Schl. n. sp." has recently been received on loan at Kew from the East African Herbarium. It was collected in March, 1912, at " Monga, 1000 m." by *Grote* (no. 3756).

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* Continued from Kew Bull. **1955,** 292 (1955).

Monga is some 2 km. from Amani and in the midst of the old German plantations ; there can be no doubt that *Grote's* specimen was taken from an introduced cultivated plant.

Pleurostelma *Baill.*

This monotypic genus was described by Baillon in 1891 and to it he referred a single new species, *P. grevei* Baill. It is unfortunate that this name antedates *Microstephanus* N. E. Br. (1895), for Brown, whilst recognising the genus as distinct from *Astephanus* R. Br., also corrected Decaisne's (1838, 1844) treatment by uniting three species, together with a fourth described later by Klotzsch (1861), and gave a full description. Choux (1914) established the synonymy of *Microstephanus* and *Pleurostelma*, but did not make the necessary nomenclatural amendment. Although there are now many more collections in the Kew herbarium, there is little to add to the distribution given by Brown (1902) which, briefly, is " eastern coast of Africa from Kenya to Mozambique, Zanzibar, Pemba, Mozambique Island, Madagascar and Aldabra Islands ". *Pleurostelma* Schltr. (1895), is a later homonym which has been replaced by *Schlechterella* K. Schum. (1899). (See Bullock in Kew Bull. **1954,** 360 : 1954).

Pleurostelma cernuum (*Decne.*) *Bullock*, comb. nov.

Astephanus cernuus Decne. in Ann. Sc. Nat. Sér. 2, **9,** 342 (1838), et in DC. Prodr. **8,** 507 (1844) ; K. Schum. in Engl. Pflanzenw. Ost Afr. **C,** 321 (1895).

A. ovatus Decne. *ll.cc.* ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 224 (1895).

A. arenarius Decne. in DC. Prodr. **8,** 507 (1844).

A. recurvatus Klotzsch in Peters, Reise Mossamb. Bot. 274 (1861) ; K. Schum. *l.c.*

Pleurostelma grevei Baill. Hist. Pl. **10,** 266 (1891), in adnot. (descr. gen.-spec.).

Microstephanus cernuus (Decne.) N. E. Br. in Kew Bull. **1895,** 249 (1895), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 288 (1902) ; Choux in Ann. Mus. Colon. Marseille, Sér. 3, **2,** 277–281, t. 14 (1914), et in Cat. Pl. Madag. Publ. Acad. Malgache, Asclep. 8 (1931).

Periploca ovata Poir. ex Decne. in DC. Prodr. **8,** 508 (1844), in syn.

Conomitra *Fenzl*

The available material of this genus is very strictly limited and although the flowers have been described very few remain attached to the specimens in the Kew herbarium, all of which bear mature or almost mature follicles. The latter serve to distinguish the genus from *Glossonema*, with which it has been united ; they are narrowly linear-terete and quite smooth, whereas those of *Glossonema* are stoutly fusiform and sparsely softly spinous. The leaves also are narrowly linear-lanceolate and very thinly herbaceous, whilst the leaves of *Glossonema* species although often narrow are often suborbicular and always somewhat fleshy. Further,

Conomitra is said to be an annual with solitary flowers, whilst *Glossonema* species are perennials with clustered flowers.

Bentham (in Benth. et Hook. f. Gen. Pl. **2,** 749 : 1876) was doubtful of Decaisne's reduction of *Conomitra* but remarked that the material was too scanty for proper examination. K. Schumann (1895) definitely resuscitated the genus but it was again reduced by Brown (1902), without any comment.

Only one species has been recognized :—

Conomitra linearis *Fenzl* in Endl. Nov. Stirp. Dec. 66 (1839) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 226 (1895).

Glossonema lineare (Fenzl) Decne. in DC. Prodr. **8,** 555 (1844) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 291 (1902) ; Andrews, Fl. Pl. Anglo-Egypt. Sudan, **2,** 407 (1952).

Sudan. Ad montem Cordofanum Arasch Cool inter gramina locis siccioribus ; Sept. 1840 (fr.), *Kotschy* 78 (Also in Herb. Florence). Kordofan ; " 1837, 1838 " (fr.), *Kotschy* 35.

It is remarkable that this plant has not been collected by anyone since 1840.

Glossonema *Decne.*

The genus *Glossonema* was described by Decaisne (1838) for a perennial Arabian plant with edible, softly spinous, fleshy follicles which he had already (1835) described as *Cynanchum boveanum.* In his account of the *Asclepiadaceae* in De Candolle's *Prodromus* (1844) he added *G. nubicum,* a new species, to the genus, and *G. lineare,* both from the Southern Sudan. *G. lineare* was based upon *Conomitra lineare* Fenzl, described as a monotypic genus of annual plants with smooth, dry, linear follicles, totally distinct from *Glossonema* (*supra*).

A number of species have been described by later authors, notably *G. varians* (Stocks) Benth. ex Hook. f. from Baluchistan and Sind, and *G. revoilii* Franch. and *G. thruppii* Oliv. from the horn of Africa. Apart from *G. macrosepalum* Chiov., known from only one collection in Italian Somaliland and here regarded as a " doubtful " species, all the specimens I have seen can be placed in one of the four species mentioned above ; I have regarded *G. nubicum* Decne. as a subspecies within *G. boveanum,* and the remaining dozen or more names involved in the genus I have reduced to synonymy.

Glossonema species are plants of the hot semi-arid regions from Senegal in the west through the southern outskirts of the great north African desert to the Sudan, Kenya, Tanganyika, Ethiopia, Somalia, Egypt, Arabia, Socotra, and southern Persia to Baluchistan and Sind. There are records also from various North African stations, but these may represent accidental introductions, since the plants are greedily eaten by all kinds of stock and occasionally as a salad vegetable by humans ; the sweet fleshy fruit is a valued prize, especially among herd-boys. All parts of the plant exude copious latex, but this is frequently described as " *dulcis, innocuus* ".

I am much indebted to Prof. Pichi-Sermolli for the loan of some thirty specimens from the herbarium at Florence ; these specimens are denoted

by (F) following the collectors' numbers in the enumeration ; some of the Kew specimens are duplicated in both the Florence and the British Museum herbaria.

The distribution of the various species is indicated in the accompanying table. One of the more striking features of the distribution of the genus is the apparent absence of both *G. boveanum* and *G. varians* from Socotra, where either or both might have been expected to occur rather than the more strictly African *G. revoilii*.

	Baluchistan and Sind	Persia	Arabia	Socotra	Egypt and North Africa	Eritrea	Italian Somaliland	British Somaliland	Ethiopia	Sudan	West Africa	Kenya	Tanganyika
G. varians	+	+	+										
G. boveanum													
subsp. *boveanum*			+		+	+		+	+	+			
subsp. *nubicum*										+	+		
G. revoilii				+			+	+	+			+	+
G. thruppii								+					
G. macrosepalum							+						

KEY TO THE SPECIES OF *Glossonema*.

Coronal lobes subulate, incurved at the apex ; leaves petiolate, lamina oblong-elliptic, broadly ovate or almost rotund, usually rounded at base and apex ; style truncate *G. revoilii*

Coronal lobes broad, rounded at the apex or emarginate, more or less ovate or subquadrate :

Leaves subsessile, lamina more or less oblong to ovate, narrowed to the base, subacute at the apex ; style truncate ; fruit with soft spinelike processes up to 2·5 cm. long *G. thruppii*

Leaves petiolate, rotund to linear :

Calyx lobes narrowly triangular-subulate, not widened towards the apex ; leaf-margins often undulate :

Style-apex conical ; slightly exceeding the staminal column:

Leaves ovate or ovate-lanceolate, rarely broader or narrower, often very small *G. boveanum* subsp. *boveanum*

Leaves linear or narrowly linear-lanceolate, never broader *G. boveanum* subsp. *nubicum*

Style-apex truncate, not exceeding the staminal column; leaves more or less rotund *G. varians*

Calyx lobes spathulate ; doubtful species . . . . . *G. macrosepalum*

The fruits of *Glossonema* species are usually described as " softly echinate ", a description which apart from being contradictory scarcely gives a correct impression. The fruits are in fact provided with scattered, soft, spine-like processes which, as noted in the key, become astonishingly large in *G. thruppii*.

Glossonema revoilii *Franch.* Sert. Somal. in Révoil, Faune et Fl. Pays Çomalis, 40, t. 3 (1882) ; Balf. f. in Trans. Roy. Soc. Edinburgh, **31,** 168 (1888), et in Forbes, Nat. Hist. Socotra, 485, 523 (1903) ; K. Schum. in Ann. Ist. Bot. Roma, **7,** 36 (1897), et in Engl. Bot. Jahrb. **33,** 322 (1903) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 292 (1902) ; Chiov. Res. Sc. Miss. Stef.-Paoli Somal. Ital. Bot. 114 (1916), et Fl. Somala, **2,** 294 (1932).

G. elliotii Schltr. in Journ. Bot. **33,** 304 (1895).

G. rivaei K. Schum. in Engl. Bot. Jahrb. **33,** 323 (1903), incl. syn.

The reduction of *G. elliotii* was carried out by Brown (1902) and after seeing the material of *G. rivae* in the Florence herbarium I have no hestitation in reducing that species also.*

In spite of the very adequate set of specimens listed below, I have seen only two mature (dried) follicles of this species ; these are ovoid, just over 3·5 cm. long and about 1·5 cm. in diameter, narrowed to a very acute apex and clothed with soft prickle-like processes the longest of which is scarcely more than 5 mm. long.

Ethiopia. Ten miles south-west of Wardere, 6° 30′ N., 44° 30′ E., 2500 ft., in gravelly soil in a valley with bushes less than 20 ft. high and 10–20 yards apart ; " rare herb 6 ins. high with softly hairy leaves and bright lemon-yellow flowers " ; Oct. 1953 (fl.), *Ellis* 148. South-west of El Rago, 6° 33′ N., 45° 43′ E., 2500 ft., in stony ground at the foot of hills with shrubs 10–18 m. apart and poor ground vegetation** ; " rare herb up to 14 ins. high with pale green leaves covered by short woolly hairs and with lemon flowers " ; Nov. 1953 (fl., fr.), *Ellis* 250. Harar, between Derbila and Erer ; Aug. 1909 (fl.), *Negri* 1344 (F).

British Somaliland. Without locality ; *Lort Phillips* s.n. ; *Thomson* 87. Golis Range ; *Drake Brockman* 104. The Haud (on the Ethiopian boundary), 1700 ft. ; April 1932 (fl.), *Godfrey-Faussit* 23. The Haud (on the Ethiopian boundary), 2400 ft. ; June 1932 (fl.), *Godfrey-Faussit* 101. Boundary Pillar 93, 8° 37′ N., 45° 9′ E., 3300 ft. ; " flowers yellow " ; Oct. 1932 (fl.), *Gillett* 4218. Dobo Pass, 10° 15′ N., 43° 15′ E., 4000 ft., on gneiss hills in open *Acacia* woodland ; " flowers yellow with a reddish-brown centre " ; Febr. 1933 (fl.), *Gillett* 4968. 9° 48′ N., 43° 17′ E., 1640 m., in stony soil with quartz ; " flowers yellow " ; May 1933 (fl.), *Godding* 6. Darobobe, 10° 7′ N., 42° 58′ E., 1868 m., in stony ground ; " flowers yellow-brown " ; Aug. 1933 (fl.), *Godding* 117. Without locality ; Oct. 1941 (fl.), *Peck* 259. Border country near Bohodle ; " small bush 1 ft. high with creamy flowers " ; Oct. 1944 (fl.), *Glover and Gilliland* 214. Kodoyareh, 4 mls. south of Dar Bruck, on rocky ground ; " common erect herb, flowers yellow with red centre " ; May 1949 (fl.), *Bally* 7185. Eighteen mls. east of Borama, 5500 ft., in open ground on rocky hillside ; " grey-green herb, flowers yellow with orange and brown centre " ; Aug. 1953 (fl.), *White* 129. Ten miles east of Borama, 4500 ft., in rocky soil ; " much branched herb with many stems from the [perennial] base, corolla-lobes yellow with a red base, corona-lobes hooked, pointing upwards and inwards " ; Oct. 1954 (fl.), *Bally* 9924.

Italian Somaliland. Daua river, near Dolo [4° 15′ N., 42° 5′ E.] ; *Riva* 1129 (*typus* : *G. rivaei* K. Schum. ; there is a flower and leaf in the Kew herbarium). Chisimaio, between Saamoggia and Afmadu ; *Gorini* 131 (F). El Uré ; Nov. 1913 (fl.), *Paoli* 1072 (F). Dolo, near the Daua river ; April 1893 (fl., fr.), *Riva* 1129*** (F). On a stable dune at Giumbo ; June 1913 (fl.), *Paoli* 230 (F). Between Dunum and the Ganale Doria ; Oct. 1937 (fl.), *Vàtova* 302 (F). Dunum ; Oct. 1937 (fl.), *Vàtova* 273 (F).

Socotra. Near Jamarid (Balfour's Camp) ; April 1881 (fl.), *Schweinfurth* 315. Jalousir ; April 1881 (fr.), *Schweinfurth* 260. Without locality ; *Bent* s.n. ; *Balfour* 87.

Kenya Colony : Kikumbuliyu ; Nov. 1893 (fl.), *Scott Elliot* 6184 (typus : *G. elliotii* Schltr.). Wajir, Northern Province, in red sandy soils with *Acacia*, *Delonix*, *Commiphora* etc. ; " herb to 9 ins. with yellow flowers and edible fruits " ; Jan. 1955 (fl.), *Hemming* 437.

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*The type of *G. rivae* was seen by the late Miss E. A. Bruce prior to 1939 ; her manuscript note in the Kew herbarium states that it is not specifically distinct.—A.A.B.

**Dr. Ellis remarks that " the last rain fell on 7th Nov."—A.A.B.

***This specimen also bears the numbers 717 and 1249.

Tanganyika Territory. Shinyanga, in damp, fairly open cleared ground ; "flowers yellow with brownish-red centre" ; Febr. 1933 (fl.), *Bax* 185. Katumbane (North Masailand), 5000 ft., in *Themeda-Exotheca* mountain grassland, in an open *Acacia–Commiphora–Pappea* association, on brown very stony, volcanic soil ; not common ; " a perennial yellow-flowered bushy herb, young fruits eaten by herd boys [vern. name ; OLKARERE (Kimasai)]" ; Jan. 1936 (fl.), *Greenway* 4276. Banagi Hill, 4200 ft., in poor sandy soil in open savannah ; not very common ; " plant up to a foot high, with greenish flowers" ; Dec. 1937 (fl.), *Moore* 1. Shinyanga ; *Koritschoner* 1923. Shores of Lake Natron, 2050 ft., among rocks ; " corolla-lobes golden yellow, base pink, corona white, central pentagon green, turning pinkish-maroon" ; Dec. 1944 (fl.), *Bally* 4108. Magungu river, Baragi area, Musoma, Lake Province, 4500 ft., in grassland on dark loam near riverine forest ; " squat bushy plant to 12 ins. high, with milky sap ; flowers yellow and brown, not aromatic" ; Nov. 1953 (fl.), *Tanner* 1713.

Glossonema thruppii *Oliv.* in James, Unknown Horn of Africa, App. 320 (1888) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 293 (1902).

G. hispidum Hutch. et Bruce in Kew Bull. **1941,** 146 (1941).

This appears to be a rare endemic species, similar in general appearance to *G. revoilii* but differing sharply in its sessile leaves and broad coronal lobes. The type of *G. hispidum* consists of very young growths, which accounts for the differences given in the original diagnosis.

The fruit is considerably larger than in any other species ; the spirit specimen attached to Mr. Bally's collection includes a single follicle (the fruit in this genus is apparently always a single follicle) ovoid in shape, narrowed to a subacute apex, somewhat more than 6·5 cm. long and 3 cm. in diameter ; it is scarcely " echinate " but is provided with about twenty soft spine-like processes up to 2·5 cm. long, together with a few very small soft prickles no more than 2–3 mm. long.

British Somaliland. Ouananuff ; *James and Thrupp* s.n. (*holotypus in herb. Kew.*). Ethiopia–Somaliland boundary, 8° 57′ N., 44° 10′ E., 4200 ft., in open places in *Acacia*-grass country ; " flowers dull yellow ; fruit eaten by Somalis [vern. name ; SUBKAB]" ; Sept. 1932 (fl.), *Gillett* 4081 (*holotypus* : *G. hispidum* Hutch. et Bruce). Ten miles east of Borana, 4500 ft. ; " leaves narrow, fruits mace-like, eaten by Somalis [vern. name ; ASKAR]" ; Oct. 1954 (fl., fr.), *Bally* 9926 (with fruit in spirit). Burrehar in Erigavo ; " grazed by all classes of stock, and yields a round green fruit which is sweet and much relished by the Somalis ; [vern. name ; KHURUCHI (Somali)]" ; Oct. 1941 (fl.), *Peck* 254.

Glossonema boveanum (*Decne.*) *Decne.* in Ann. Sc. Nat. Sér. 2, **9,** 335 (1838), et in DC. Prodr. **8,** 554 (1844), holotypus nominis generici ; Boiss. Fl. Or. **4,** 61 (1879) ; Deflers in Rév. Egypte, **1,** 421 (1895), et in Mém. Inst. Egypt. **3,** 257 (1896) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 226, f. 65L–N (1895) ; Hirsch, Reisen Südarab. 306 (1897) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 292 (1902) ; Capua in Pirotta, Fl. Col. Eritrea (in Ann. Istit. Bot. Roma, **8**), 213 (1903) ; K. Krause in Engl. Bot. Jahrb. **35,** 726 (1905) ; Blatter in Rec. Bot. Survey India **7,** 243 (1914–16) et *l.c.* **8,** 294 (1916–39) ; Post, Fl. Syria, Palest. Sinai, ed. Dinsmore, **2,** 194 (1933) ; Jahandiez et Maire, Cat. Pl. Maroc, **3** : 581 (1934) ; Schwartz, Fl. Trop. Arab. (in Mitt. Inst. Allgem. Bot. Hamburg, **10**), 187 (1939) ; Hutch. et Bruce in Kew Bull. **1941,** 146 (1941) ; Guinea, Veg. Past. Sahara Español, 100 (1945) ; Andrews, Fl. Pl. Anglo-Egypt. Sudan, **2,** 408 (1952).

Subsp. **boveanum.**

Petalostemma chenopodii R. Br. in Salt, Voy. Abyss. App. p. lxiv (1814), nomen tantum.

Cynanchum boveanum Decne. in Ann. Sc. Nat. Sér. 2, **4,** 82 (1835).

Gomphocarpus pauciflorus Hochst. et Steud. ex Steud. Nom. Bot. ed. 2, **1,** 698 (1840), nomen tantum, non Klotzsch (1861).

Glossonema affine N. E. Br. in Kew Bull. **1895,** 249 (1895), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 292 (1902), in syn.

G. echinatum Hochst. ex Capua in Pirotta, Fl. Col. Eritrea (in Ann. Istit. Bot. Roma, **8**), 214 (1903).

G. erlangeri K. Schum. in Engl. Bot. Jahrb. **33,** 322 (1903).

[*G. revoilii* (non Franch.) ;—K. Schum. in Ann. Istit. Bot. Roma, **7,** 36 (1897).]

Brown (1902) distinguished *G. boveanum* from *G. nubicum* by the broad leaves of the former compared with the narrow (" linear or linear-lanceolate ") of the latter. The distinction, however, disappeared even in his key, which admitted that *G. boveanum* might also have linear-lanceolate leaves. I have, therefore, reduced *G. nubicum* to subspecific rank under *G. boveanum*.

Morocco. Oasis d'Akka ; March 1872 (fl.), *Beaumier (ex herb. Cosson.).*

Spanish Sahara. Aguerbás ; July 1945 (fr.), *Agacino* 207.

Egypt. " Upper Egypt " ; *Parlatore* s.n. Between Kosser and Ras Benass ; March 1864 (fl.), *Schweinfurth* 190. Gebel Elba ; Jan. 1933 (fl.), *Shabetai* 1052 ; Feb. 1933 (fl., fr.), *Shabetai* s.n.

Arabia. Jeddah golf course, in open sandy ground ; Dec. 1939 (fl.), *Trott* 114. " In arenosis ad rupes prope Ferihe Arab. felicis " ; Febr. 1856 (fl., fr.), *Schimper* 920. Jeddah ; *Zohrab* 134, 158 ; *Krucht* s.n. (F). Ridge 5 m. north of Jeddah, and at 3 m. on the Mecca road, in open ground among grasses ; " small pinkish and purple flowers, relatively large smooth fruit with spines " ; Dec. 1949 and Jan. 1950 (fl., young fr.), *Trott* 1269. Ridge 4 m. north of Jeddah, and 25 m. along road to north-north-east of Jeddah, in stony ground ; May 1950 and Jan. 1951 (fl., fr.), *Trott* 1553 ; similar locality, and on island in the harbour ; Jan. 1951 (fr.), May 1951 (fl.), *Trott* 1674. On shore near Jeddah ; March 1940 (fl., fr.), *Trott* 203. " In planitiè arenosa Jeddae " ; Dec.–Jan. 1837 (fl., fr.), *Fischer* 198.

Aden. *Boycott* 72, s.n., Jan. 1872 (fl., fr.), *Thomson* s.n. " Small plant with creamy-white flowers " ; April 1894 (fl.), *Lunt* 338.

Eritrea. Assarka ; March 1892 (fl., fr.) ; *Terracciano* 11 (F). Dogali ; March 1892 (fr.), *Terracciano* 70 (F). Ras-Ghedem ; March 1892 (fr.), *Terracciano* 37 (F). Anfila Bay ; March 1892 (fr.), *Terracciano* 38 (F). Comailè Valley, Assaorta ; March 1903 (fr.), *Pappi* 5864 (F). Otumbo ; Dec. 1902 (fl.), *Tellini* 433. Schumma Island ; Feb. 1903 (fl.), *Tellini* 518 (F), 399 (F). Dar-Gullah ; March 1892, *Terracciano* 4 (F). Um Namus ; March, 1892, *Terracciano* 13 (F). Schumma Island ; March 1892, *Terracciano* 12 (F). Around Saati ; Febr. 1892 (fr.), *Schweinfurth and Riva* 584.

British Somaliland. Guban ; *Drake-Brockman* 998. Berbera, 200 ft., in shingly plain ; Jan. 1932 (fl.), *Gillett* 4762. Berbera ; Aug. 1941 (fl., fr.), *Peck* 291. Senag Plains ; " erect herb 4–5 in. high ; very local " ; May 1949 (fl.), *Bally* 7242. Between Zeila and Somadu, near Hensa ; Febr. 1900 (fl.), *Ellenbeck* 195 (*typus* : *G. erlangeri* K. Schum.) (fragment in herb. Kew.).

Ethiopia. Valley of the Tacase river, 3000–3300 ft. ; Aug. 1854 (fl., young fr.), *Schimper* 2219* (*holotypus* : *G. affine* N. E. Br.). Without locality ; *Salt* s.n. (fragment in herb. Kew.).

Sudan. Suakin, Hor Tamanib ; Febr. 1869 (fl.), *Lord* s.n. About 21° N. (50–100 mls. north of Port Sudan) ; *Bent* s.n. Perim Island ; *Farmer* s.n., *Coomaraswamy* s.n.

Subsp. **nubicum** (*Decne.*) *Bullock*, comb. et subsp. nov.

G. nubicum Decne. in DC. Prodr. **8,** 555 (1844) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 226 (1895) ; N. E. Br. in Thiselton-

* A matching specimen in herb. Florence, of the same date and from the same locality but without the collector's name, is numbered 86 ; this is perhaps a wrong label as there is also in herb. Florence another specimen labelled *Schimper* 86.—A.A.B.

Dyer, Fl. Trop. Afr. **4** (1), 291 (1902) ; Capua in Pirotta, Fl. Col. Eritrea (in Ann. Istit. Bot. Roma, **8**), 213 (1903) ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 55 (1931) ; J. M. Dalz. Useful Pl. W. Trop. Afr. 387 (1937) ; Andrews, Fl. Pl. Anglo-Egypt. Sudan, **2,** 407 (1952).

[*G. boveanum* (non Decne.) ;—Hochst. et Steud. in sched. Kotschyi iter nubicum No. 405 ; Decne. in DC. Prodr. **8,** 555 (1844), in syn.]

G. gautieri Batt. et Trabut in Bull. Soc. Bot. France, **53,** sess. extr. p. xxviii (1907) ; Diels in Engl. Bot. Jahrb. **54,** Beibl. No. 120, 108 (1917).

G. gautieri var. *titensis* Batt. et Trabut, *l.c.* xxix ; Diels, *l.c.*

Although the type of this taxon was collected in the southern Sudan (*Kotschy* 405), its main area is much further to the west. It is the only representative of the genus known to occur in the southern Sahara and the dry northern parts of the west African territories. It is characterised by its narrow (" linear or linear-lanceolate ") leaves, but this does not rigidly separate it from *G. boveanum* subsp. *boveanum*. The latter frequently produces leaves which are sufficiently narrow to be called linear or linear-lanceolate, but specimens showing such leaves usually also have leaves which are much too broad to fit such a description, or else they are very small and the plant is in an obviously depauperate state. The relative width of the leaves, however, is probably genetically controlled, since equally depauperate specimens may have all their leaves almost rotund, but much reduced in size.

The distinction between the two subspecies becomes, therefore, mainly geographical and serves merely to record the fact that the West African plant is invariably narrow-leaved.

French Sudan. Timbuctoo ; July 1927 (fl., fr.), *Hagerup* 214; June 1927 (fl.), *Hagerup* 132.

Gold Coast. Navrongo District, Northern Territory 500–600 ft. ; " herb 5 in. high, in poor soil, very common in old farm land in dry season ; leaves eaten raw " ; March 1938 (fl.), *Vigne* 4487 ; March 1939 (fl., fr.), *Vigne* 4682.

Northern Nigeria. *Barter* 723, 923, 3434, s.n. Katagum District ; Dec. 1907 (fl.), *Dalziel* 99. Sokoto ; " very common in fields [vern. name ; TARIN GIDA] " ; Jan.–Febr. 1911 (fl., fr.), *Dalziel* 368. Sokoto ; " small branching herb of fields ; flowers minute, yellowish-red ; eaten by goats and occasionally used as human food in times of famine [vern. name ; TARIN GIDA (Hausa)] "; March 1922 (fl.), *Moonie* s.n. Fodama ; Dec. 1921 (young fl.), *Moiser* 187. Bornu ; *Vogel* 88. Without locality or date ; *Thornewill* 30, 35. Kontagora Division, in forecourt of headman's house at Ibeto, on trodden sandy soil ; " a spreading or sub-prostrate herb, stems dull purplish ; leaves slightly glaucous-green ; flowers white, faintly tinged green fading to pale brown ; fruits purplish-green " ; Jan. 1950 (fl., fr.), *Meikle* 1048 (with material in spirit).

British Cameroons. Barra, Dikwa Division, 1000 ft., near to cultivation ; Jan. 1955 (fl.), *McClintock* 155.

Sudan. " In savannis ad fines Cordofanas montemque Kohn versus Tekele " ; Nov. 1839 (fl., fr.), *Kotschy* 405 (*typus nominis subspecei* in herb. Kew. ; isotypus in herb. F.). Near El Gidan ; 1820–1826 (fl., fr.), *Ehrenberg* s.n. (K., F.) Near Kor Ashat, 70 miles from Port Sudan, on the Red Sea coast ; 1935 (fl., fr.), *Maxwell Darling* 145. Tokar delta, 200 ft., locally common on sandy soil ; " erect herb to 6 in. high, deep rooted, flowers small, whitish-pink " ; April 1949 (fl., fr.), *Bally* 6983. El Gidan ; May 1828 (fl., fr.), *Ehrenberg* s.n.

Glossonema varians (*Stocks*) *Benth. ex Hook. f.* Fl. Brit. India, **4,** 16 (1883) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 226 (1895) ; Woodr. in Journ. Bombay Nat. Hist. Soc. **12,** 166 (1898) ; Cooke, Fl. Bombay, **2,** 150 (1904) ; Burkill, Fl. Pl. Baluchistan, 48

(1909) ; Blatter et Hallberg, Fl. Ind. Des. (in Journ. Bombay Nat. Hist. Soc. **26**), 539 (1919) ; Parsa, Fl. Iran, **4** (1), 59 (1952).

Mastostigma varians Stocks in Hook. Ic. Pl. t. 863 (1852) ; Aitch. Cat. Pl. Punjab and Sind, 89 (1869) ; Boiss. Fl. Or. **4,** 51 (1875).

Glossonema edule N. E. Br. in Kew Bull. **1895,** 183 (1895) ; Schwartz, Fl. Trop. Arab. (in Mitt. Inst. Allgem. Bot. Hamburg, **10**), 187 (1939) ; Parsa, *l.c.*

G. arabicum Deflers in Bull. Soc. Bot. France, **43,** 110 (1896), et in Mém. Inst. Égypt. **3,** 257 (1896) ; Schwartz, *l.c.*

G. haussknechti Bornm. in Beih. Bot. Centralbl. **61** (B), 80, t. 1 (1941), sine descr. lat. (ex icon.).

There can be little doubt that the last three synonyms given above represent a single taxon, but their inclusion in *G. varians* calls for some comment. Brown (1895) stated that the flowers of *G. edule* were much smaller than those of *G. varians* and there is certainly a considerable difference in size between flowers of the type specimens of the taxa here united. Other specimens, however, show a general trend of an edaphic nature ; greater luxuriance of growth, allied with thinner indumentum, is correlated with larger flower-size, smaller flower-size correlates with denser indumentum and more depauperate growth. These characters, it is postulated, are within the variance to be expected of a plant of semi-arid countries where there may be great variation in fertility and in the seasonal incidence of rain.

The plant is apparently valued throughout its range as a salad, and the fleshy fruits are also eaten.

Arabia. Foot of Dhofar mountains ; " small green flower ; eaten as salad " ; *Bent* 175 typus : *Glossonema edule* N. E. Br. . " Southern Arabia " ; *Hirsch* 21. *Pilgrim* s.n. Dhaharan, C.A.S.O.C. oil camp, on sandy hill slopes surrounding settlement ; "prostrate plant 5 in. high with grey-green leaves and clusters of yellow-brown flowers " ; March 1942 (fl.), *Dickson* 464 ; March 1947 (fl., fr.), *Dickson* 521.

Bahrain Islands. March 1950 fl., fr. . *Good* 179, 180, 181. New Camp ; "globular bush, common on stony ground " ; Oct. 1935 (fl.), *Fernandez* 35.

Iran. Aucher-Eloy-Herbier d'Orient No. 4927.

Baluchistan. On the coast ; *Pierce* s.n.

Sind. Jemidar Ka Landa, near Kurrachee ; " fruit called MOONGA, much eaten " ; 1851 fl., fr. . *Stocks* s.n. *typus nominis specei* . Without locality : *Frere* s.n., *Stocks* s.n., *Dalzell* 64, s.n.

Species dubia

Glossonema macrosepala *Chiov.* Res. Sc. Miss. Stef.-Paoli Somal. Ital. Bot. 113 (1916).

I have seen only the type-specimen of this species and regard its status as somewhat doubtful. The spathulate calyx-lobes, although not larger than in specimens of *G. revoilii* are unlike those of any of the other species, and it lacks the hispid indumentum characteristic of other species.

The type specimen, however, is a poor one and more material of this plant is required before its status can be properly assessed.

Odontostelma *Rendle*

The monotypic genus *Odontostelma* Rendle was included by N. E. Brown in his very wide conception of *Schizoglossum* E. Mey. to which I

have several times referred in this series of papers. The " spotting " characters of *Odontostelma* are the deeply buried carrot-like tuber (the " neck " is about three inches long) and the spathulate corolla-lobes. The genus seems to be nearest to *Glossostelma* Schltr. which I have already (Kew Bull. **1952,** 414–417 : 1952) resuscitated.

Odontostelma welwitschii *Rendle* in Journ. Bot. **32,** 161, t. 344 (1894) ; Hiern in Cat. Afr. Pl. Welw. **1,** 683 (1898).

Schizoglossum welwitschii (Rendle) N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 365 (1902).

Odontostelma minus S. Moore in Journ. Bot. **50,** 363 (1912).

Angola. Between Forte Princeza Amelia and the Cubango River ; *Gossweiler* 2332 (B.M.), 4210 (B.M.). Bushy pastures near Lopollo, Huilla ; Dec. 1859–Jan. 1860 (fl.), *Welwitsch* 4172 (*holotypus in herb. Mus. Brit.* ; *isotypus in herb. Kew.*)

Northern Rhodesia. Muckle Neuk, 12 miles north of Choma, 4200 ft., in a dry dambo ; " low herb growing erect from a single carrot-shaped tuber ; petals brown " ; Nov. 1954 (fl.), *Robinson* 994.

Southern Rhodesia. Near Salisbury ; Nov. 1919 (fl.), *Eyles* 1879 ; *ibid.*, Dec. 1927 (fl.), *Daphne King ex Eyles* 5229. Cleveland Dam, Salisbury, 4500 ft., in burnt vlei ; " parsnip-like tuberous roots 2·5 ins. × 0·33 ins., flowers greenish, purple-tinged " ; Oct. 1951 (fl.), *Wild* 3664 (with spirit material).

Brown (1902) recorded only the type collection of this species but the extension of the known range given above indicates that it is probably widespread in the seasonal swamp grasslands of southern tropical Africa. Its low stature, narrowly linear leaves and greenish brown flowers will, however, make it extremely difficult to find. S. Moore's species *O. minus* is no more than a small-flowered form repeated in the specimens from Southern Rhodesia.

Trachycalymma *Bullock*

This genus was established in 1953 to accommodate certain species which had been referred to *Asclepias*, from which they are technically distinguishable by their fleshy corona-lobes which are papillate on the inner face. I then suggested that the genus included 4–5 species from tropical and South Africa, but listed only three tropical species. The following should be added :—

Trachycalymma cucullatum (*Schltr.*) *Bullock*, comb. nov.

Gomphocarpus cucullatus Schltr. in Engl. Bot. Jahrb. **17,** Beibl. No. 45, 17 (1894), et *l.c.* **20,** Beibl. No. 51, 28 (1895).

Asclepias pygmaea N. E. Br. in Kew Bull. **1895,** 255 (1895), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 350 (1902).

A. cucullata (Schltr.) Schltr. in Journ. Bot. **34,** 455 (1896) ; N. E. Br. in Thiselton-Dyer, Fl. Cap. **4** (1), 671 (1907).

Tanganyika Territory. Soa, Iringa, 6500 ft., fairly common in some places, especially after fires, in *Hyparrhenia-Trichopteryx* mountain grassland ; " perennial herb up to 8 ins. tall with rose-purple flowers " ; July 1933 (fl.), *Greenway* 3428. Lower plateau north of Lake Nyasa ; *Thomson* s.n. (*holotypus* : *Asclepias pygmaea* N. E. Br., *in herb Kew.*).

Southern Rhodesia. Mare River, Inyanga, 6100 ft., in open grassland ; " erect herb with yellow-green flowers tinged with purple " ; Oct. 1946 (fl.), *Wild* 1522 (Government Herbarium, Salisbury, No. 16066). Inyanga, 5800 ft., on dry hill slope ; Oct. 1935 (fl.), *Eyles* 8493. Vumba Mts., Umtali ; Oct. 1950 (fl.), *Chase* 3103 (Government

Herbarium, Salisbury, No. 31062). Summit of Chinakwaremba, Vumba Mts., in grassland ; " flowers white " ; Nov. 1949 (fl.), *Chase* 1835 (Government Herbarium, Salisbury, No. 26968).

Transvaal. Saddleback Mt., Barberton, 3500–4500 ft. ; Sept. 1890 (fl.), *Galpin* 1034 (*isotypus in herb. Kew.*). Frischgewacht, Zoutpansberg ; Sept. 1905 (fl.), *Leendertz* 826. Mbabane, Swaziland ; Nov. 1906 (fl.), *Miller* s.n.* Evarard's Farm, Carolina ; Nov. 1916 (fl.), *Pole Evans* 13167.

Orange Free State. Harrismith ; Nov. 1904 (fl.), *Sankey* 185.

Natal. Between Greytown and Newcastle ; Nov. 1883 (fl.), *Wilms* 2141. Van Reenen, Drakensberg, 5000–6000 ft. ; " calyx brown, corolla and corona yellow " ; Nov. 1892 (fl.), *Medley Wood* 4820.* Greenwich Farm, Riet Vlei ; Nov.-Dec. 1899 (fl.), *Fry ex herb. Galpin.* 2741. Shafton, Howick ; " Spring 1900 " (fl.), *Hutton* 347. Dumisa, Alexandra, 800 m. ; Oct. 1910 (fl.), *Rudatis* 1191. National Park, in grass near hostel ; " flowers greenish-brown " ; Sept. 1930 (fl.), *Hutchinson* 4629. Polela, 7–10 miles south-west of Underberg, occasional in grassveld ; " flowers mauve-tinted " ; Dec. 1935 (fl.), *Dyer* 3237.

Eastern Cape Province. Transkei ; *Hallack.* Hillsides at Baziya, Umtata Division, 2000 ft. ; *Baur* 305 (partly).

There is a considerable variation in the amount of indumentum on all parts of different individuals of this species, but it is always of the same kind. That of the inflorescence and flowers is soft and more or less crisped, whilst that of the leaves is stiff and each hair has a conical base. Brown (1895, 1902, 1907) did not distinguish between *Gomphocarpus cucullatus* and *Asclepias pygmaea*, but I have been unable to find any difference of specific value. The new records from Southern Rhodesia serve to connect the South African and Tanganyika distributions and the plant may be expected to occur in Northern Rhodesia, Nyasaland and probably also in Mozambique.

Cynanchum *Linn.*

The African species of *Cynanchum* exhibit a wide variety in habit which may be attributable to their invasion of almost every type of vegetation from the equatorial and montane rain forests to the semi-arid regions of north-east and south-west Africa. Their basic floral structure is, however, constant and their division into well defined groups of generic status well nigh impossible.

The normal habit form in the genus is herbaceous or semi-woody, with twining stems with relatively long internodes and broad well-developed opposite leaves ; the twining habit is usually obligatory, but the absence of suitable supports may result in a dwarfed semi-shrubby habit with short internodes ; in semi-arid country the bushy habit may become fixed as in *C. defoliascens* K. Schum., which also has small narrow leaves, or the twining habit may become facultative and the long stems merely trailing or scrambling as in the leafless *C. tetrapterum* (Turcz.) R. A. Dyer,** and the peculiar *C. omissum* Bullock described below, which apparently produces annual growths of one internode only with a single pair of early deciduous leaves. In dry regions there is also a tendency towards stem-succulence as in *C. validum* N. E. Br. and *C. omissum* Bullock, in which the

Bolus 12134, also from Mbabane, was examined by N. E. Brown (24 July, 1906) and declared to be identical with *Medley Wood* 4820. Also compared by N. E. Brown (4 Aug. 1906) are *Medley Wood* 5384 and 5667 from the Drakensberg. These specimens are not at Kew.—A.A.B.

**See p. 624. A number of leafless species of similar habit have been described from Madagascar, as well as some very closely allied genera.

hard woody central conducting tissue is surrounded by a thick softly succulent cortex enclosed in a thin impervious corky outer skin.

Distinct from all these is *C. praecox* S. Moore a precocious plant of the savannah region (Bullock in Kew Bull. **1953,** 354 : 1953, et *l.c.* **1954,** 362 : 1954), of which the leafy stems are still unknown, and which flowers at ground level towards the end of the dry season.

Cynanchum chirindense *S. Moore* in Journ. Bot. **46,** 305 (1908) ; Eyles in Trans. Roy. Soc. S. Afr. **5,** 450 (1916).

C. papillosum H. Weim. in Botan. Notis. **1935,** 398, ff. 17 f–k, 18 (1935).

Moore's species was found in the Chirinda Forest, Weimarck's in riverine forest near Inyanga, in Southern Rhodesia.

Cynanchum longipes *N. E. Br.* in Kew Bull. **1897,** 273 (1897), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 393 (1903) ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 54 (1931), excl. spec. Lamborn. cit.

The only specimen of this species hitherto collected in Nigeria is the type, and Brown saw no other material. The specimen *Lamborn* 303 cited by Hutchinson and Dalziel was collected seventy miles east of Lagos, but this is more properly referable to *C. adalinae* K. Schum., a species not very closely allied to *C. longipes*. The distribution of *C. longipes*, as shown by material at Kew, is as follows :—

Sierra Leone. Mamaka ; Nov. 1914 (fl.), *Thomas* 4553. Ronieta, 250 ft. ; Nov. 1914 (fl.), *Thomas* 5377. Njala, in secondary bush ; " climber, petals yellow, corona purple " ; Oct. 1949 (fl.), *Deighton* 5188.

Liberia. Gbanga, at the edge of original forest ; " corolla* greenish-yellow, corona ' rosaline purple ', latex milky " ; 1926 (fl.), *Linder* 653.

Nigeria. Papalayito, Lagos ; " herbaceous creeper " ; 1895 (fl.), *Millen* 48 (*holotypus*).

Belgian Congo. Lilando ; Aug. 1938 (fl.) *Louis* 10843.

Uganda. Kajansi Forest, Entebbe Road, 3900 ft., in forest undergrowth ; "climbing and scrambling to 5–6 ft. and forming a fairly dense mass ; quite handsome flowers, underside of petals greenish, yellow above, corona* deep reddish-purple, sap milky " ; July 1935 (fl.), *Chandler* 1267.

It seems clear that *C. longipes* is a widely distributed and possibly fairly common plant of secondary growth in rain-forest areas.

Cynanchum rungweense *Bullock*, sp. nov. ; affinis *C. longipedi* N. E. Br. sed floribus majoribus, corollae lobis lanceolato-triangularibus, corona longioribus, foliis discoloribus crassioribus costa subtus sanguinea subtriangularibus apice abrupte apiculatis (haud ovatis apice gradatim acuminatis) basi dissimiliter profunde cordatis differt.

Herba volubilis, circiter 2 m. alta ; caules sublignescentes, sympodiales, superne vix ramosi, 1–2 mm. diametro, internodiis 3·5–9 cm. longis, primum (lineis longitudinalibus duabus oppositis praesertim) leviter pubescentes, mox glabrescentes. *Folia* petiolata, petiolis usque 3·5 cm. longis sed plerumque 2 cm. longis rarius brevioribus supra canaliculatis pubescentibus apice glandulis 4–5 papillatis ; lamina discolor, vix coriacea sed leviter carnosa, primum leviter pubescens, mox glabrescens, circiter 5–7 cm. longa et 2·5–3 cm. lata, raro major, interdum minor et in

* The collector's notes are slightly edited.—A.A.B.

specimine unico (*Stolz* 1034) circiter 3–4 cm. longa et 1–1·3 cm. lata, plus minusve triangularis, marginibus subrectis vel levissime convexis et basin versus marginibus saepe subparallelibus, basi profunde cordata, apice abrupte apiculata, subtus costa et nervis lateralibus conspicuis sanguineo-coloratis. *Inflorescentia* lateralis, pedunculo circiter 1–1·5 cm. longo leviter pubescente simplici vel apice breviter biramoso ; flores mediocres, numerosi, subumbellatim dispositi vel demum brevissime racemiformiter dispositi ; bracteae bracteolaeque minutae, scariosae ; pedicelli filiformes, satis dense pubescentes, circiter 1 cm. longi. *Calyx* fere ad basin 5-lobatus, lobis ovatis subobtusis vix 2·5 mm. longis extra leviter puberulis. *Corolla* subrotata, tubo brevissimo, lobis patenti-reflexis triangulari-lanceolatis subacutis circiter 7 mm. longis et basi fere 3 mm. latis glaberrimis. *Corona* tubulosa, urceolata, 3–3·5 mm. alta, membranacea, apice alternatim dentibus 5 triangularibus acutis 1 mm. longis et crenis 5 late rotundatis coronata, intus infra faucem squamellis 5 obtecta. *Folliculi* non visi.

Tanganyika Territory. Undali, 6300 ft., common ; " trailing habit " ; Feb. 1933 (fl.), *Davies* 892. Mbeye, below Mporoto, southern slopes of the Poroto Mts., 6200 ft., rare, in longer, more lush grass near stream, associated with *Agauria* ; "climbing herb to six feet above ground, flowers yellow, outer envelope pinkish-green " ; March 1932 (fl.), *St. Clair-Thompson* 846 (*holotypus in herb. Kew.*). Kipalo, near Uluzi, Iringa District, 6300 ft. ; " climber with brownish-green stem, leaves lighter green below, main rib reddish ; flowers* cup-shaped, greenish-white, sepals yellowish-green " ; March 1954 (fl.), *Carmichael* 403 (East African Herb., dupl. in Kew. Herb.). Rungwe, Kyimbila District ; Dec. 1911 (fl.), *Stolz* 1034. *Ibid.*, April 1913 (fl.), *Stolz* 1983.

The earlier *Stolz* collection is of a very young growth just coming into flower ; it was probably broken off very near the base and shows that such growth tends to branch fairly freely and to bear smaller, narrower leaves than later more vigorous growths.

The comparative distribution of this species and that of *C. longipes* is interesting :—

C. longipes	*C. rungweense*
Sierra Leone, Liberia, Nigeria, Belgian Congo, Uganda, in rain forest from sea level to about 4000 ft.	Southern Tanganyika highlands above 6000 ft., in grassland or light woodland.

Morphologically the two species are as closely allied to each other as are any other two species of *Cynanchum* and it is easy to imagine an origin from the same stock produced by the elimination of intermediate ecotypic biotypes.

Cynanchum omissum *Bullock*, sp. nov., inter species hactenus cognitas inflorescentiis brevissimis persistentibus lateralibus spiciformibus floribus paucis apice seriatim aggregatis inferne cicatricibus suberosis florum delapsorum densissime obtectis, foliis apice ramulorum oppositis binis tantum, caulibus lignosis cortice molliter carnoso extra tenuiter suberosis valde distincta.

Frutex volubilis, scandens, glaber ; caules lignosi, cortice carnoso tenuiter suberoso facile exfoliato, circiter 3–6 mm. diametro, internodiis ramorum 3–7 cm. longis, ramulorum brevioribus interdum brevissimis. *Folia* subsessilia vel petiolis 1–2 mm. longis praedita, anguste elliptica vel

* The collector evidently is referring to the urceolate corona, and his " sepals " should read " corolla ".—A.A.B.

plerumque obovata, apice acuta vel plerumque late rotundata et saepe emarginata, basi semper cuneata, usque 4 cm. longa et 1·75 cm. lata sed plerumque minora, subtus nervis lateralibus vix prominulis utrinque 5–7 subparallelis praedita, ex apice ramulorum bina tantum orta, opposita. *Inflorescentiae* numerosae, e nodis foliatis vel efoliatis laterales, persistentes, floribus sessilibus paucis apice aggregatis, inferne leviter incrassatae, suberosae, cicatricibus florum delapsorum rugosae, spiciformes, interdum usque 7–8 mm. longae sed saepe breviores ; bracteae bracteolaeque obsoletae vel nullae. *Calyx* ad basin 5-lobatus, lobis triangularibus subacutis circiter 1·25 mm. longis et basi vix 1 mm. latis extra puberulis. *Corolla* virens, extra intusque minutissime papillato-puberula, tubo vix 1 mm. longo ; lobi adscendentes demum arcuato-patentes, anguste oblongo-lanceolati, leviter dextrorsum torti, apice subacuti, circiter 5 mm. longi et basi circiter 1·2 mm. lati. *Corona* tubulosa, tubo membranaceo 3 mm. longo intus longitudinaliter multicarinato, apice dentibus 10 triangularibus 0·5 mm. longis coronata, intus infra faucem lobis 5 subulatis carnosis axialiter bifurcatis dentes superantibus praedita. *Folliculi* non visi.

Kenya Colony. Between Samburu and Mackinnon Road, Kwale District, about 350 m., in *Acacia-Commiphora* thornbush ; " woody twining climber, calyx and corolla green " ; Aug. 1953 (fl.) *Drummond and Hemsley* 4045 (with material in spirit ; *holotypus in herb. Kew.*) Lorgosailie plains [south of Nairobi] ; " common climber in scrub " ; Aug. 1943 (sterile and leafless), *Bally* 2655.

Cynanchum tetrapterum (*Turcz.*) *R. A. Dyer*, MS in Herb. Kew., comb. nov.

Sarcostemma tetrapterum Turcz. in Bull. Soc. Moscow, **21** (1), 255 (1848).

Cynanchum sarcostemmatoides K. Schum. in Engl. Pflanzenw. Ost Afr. **C,** 323 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 252 (1895) (" *sarcostemmoides* ") ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 399 (1903), et in Thiselton-Dyer, Fl. Cap. **4** (1), 754 (1908), cum syn.

Monostemma tetrapterum (Turcz.) Turcz. et *M. aphyllum* (Thunb.) Turcz., *l.c.*, nomina provisoria.

Vincetoxicum sarcostemmoides Schweinf. ex Penzig in Atti Congr. Internaz. Bot. Genoa, 1892, 349 (1893), nomen nudum abortivum.

Turczanimow's epithet for this species is based upon specimens collected by *Ecklon* at the Cape, but the species is found throughout the eastern half of Africa as far north as Eritrea. Since 1895 it has been generally known as *Cynanchum sarcostemmatoides* (on account of its leafless habit, resembling *Sarcostemma*) and although Dr. Dyer annotated Kew specimens as long ago as 1931, the new name above has not been published hitherto.

Tylophora *R. Br.*

Tylophora stenoloba (*K. Schum.*) *N. E. Br.* ; Bullock in Kew Bull. **1954,** 581 (1955).

A further collection of this species has been received at Kew, and this gives me an opportunity to correct a misstatement in my previous note. In the *Flora of Tropical Africa*, N. E. Brown gave " Usambara ; Dodo " as

the locality for *Holst* 2977a, the type specimen, and this I accepted. Dodo, however, is given as being on the "Zanzibar" coast by K. Schumann, and since all the other specimens I have seen were collected in the coastal savannah, it must be assumed that Brown was in error. I have not yet seen fruiting material of this species, which apparently does not flower very freely.

Tanganyika Territory. At sea level, Machui, Tanga Pangani road, among bushes in coastal savannah ; "climbing to considerable heights : many plants seen, but only one in flower ; flowers maroon" ; Feb. 1955 (fl.), *Faulkner* 1555.

Tylophora congolana (*Baill.*) *Bullock* in Kew Bull. **1954,** 585 (1955).

I have now seen a specimen of this West African and Congo plant from Angola :—

Angola. Casai Lest, Lunda, near River Casai, 750 m., scattered in savannah ; "[subshrub] 1 m. high, flowers purple-black or chocolate-brown ; Nov. 1946 (fl.), *Gossweiler* 13853 (Herb. Serv. Agric. Angola).

Ceropegia *Linn.*

Ceropegia filiformis (*Burch.*) *Schltr.* in Engl. Bot. Jahrb. **21,** Beibl. No. 54, 13 (1896), et in Journ. Bot. **35,** 295 (1897), non Bruce (1948).

Systrepha filiforme Burch. Trav. **1,** 546 (1822).

Ceropegia infundibuliformis E. Mey. Comm. Pl. Afr. Austr. 194 (1837) ; Dietr. Syn. Pl. **2,** 891 (1840) : Decne. in DC. Prodr. **8,** 645 (1844) ; N. E. Br. in Thiselton-Dyer, Fl. Cap. **4** (1), 829 (1908).

It is necessary to draw attention to this name, since it has been omitted from the *Index Kewensis*. Brown, following the old "Kew" rule, adopted the later epithet *infundibuliformis*. Schlechter attributed the name to "Oliv. in Saund. Refug. Botan.", but I have been unable to trace this.

Ceropegia cataphyllaris *Bullock*, nom. nov.

C. filiformis Bruce in Kew Bull. **1948,** 463. t. 4 (1949), non (Burch.) Schltr. (1896).

Miss Bruce drew attention to the reduced lower leaves of this species, and the new name is in reference to them. It is known only from the type gathering, made by Mr. E. Milne-Redhead in Northern Rhodesia (Mwinilunga District).

Ceropegia ballyana *Bullock*, nom. nov.

C. helicoides Bruce et Bally in Kew Bull. **1950,** 371 (1951), non *C. helicoidea* Choux in Bull. Mus. Hist. Nat. Paris, **31,** 400 (1925).

The epithets *helicoides* and *helicoidea* must be regarded as orthographic variants and the later *helicoides* is therefore an illegitimate homonym. I have much pleasure in dedicating this species to my friend and colleague Mr. Peter R. O. Bally who by his painstaking researches in East Africa has done so much to advance our knowledge of, among many others, the genus *Ceropegia*. He discovered this plant in Kenya.

Ceropegia cancellata *Reichb.* Ic. Bot. Exot. cent. 3. pp. x et 4. t. 207 (1830).

This name has been omitted from the *Index Kewensis*, and was overlooked by N. E. Brown when he prepared his account of the genus for the *Flora Capensis*.

The plant figured is very near to *C. africana* R. Br. and to *C. assimilis* N. E. Br. From both it differs in its smaller, relatively broader leaves ; from the former, which otherwise it more closely resembles, it also differs in its completely glabrous corolla-lobes. Regarding its origin, Reichenbach states " Ex Africa australi nomine *Asclepiadia edulis* venit in Hortum Hoffmanseggeanum . . . . ."

Ceropegia schinziana *Bullock*, nom. nov.

C. boerhaaviifolia Schinz in Vierteljahrsschr. Nat. Ges. Zurich, **71,** 139 (1926), non Deflers (1895).

I do not know this plant, which was collected by *Dinter* in South West Africa.

Old Carnations and Pinks.*—The genus *Dianthus* has provided gardeners with many beautiful and often sweetly scented flowers which in modern English are usually called carnations or pinks. The former have, in the main, originated from *Dianthus caryophyllus* and the latter from *D. plumarius*. We know, however, that many species of *Dianthus* will hybridize more or less freely and amongst garden plants there are probably genes from more than one original species in some carnations and some pinks. Indeed, there is no hard and fast line between the two groups and it is not easy to say what is the difference between a pink and a carnation. " There are two things, however, which will always help to decide the point : the habit of growth, and the flowering season. The squat and matted growth is an unmistakable mark of these older pinks, and their season of bloom is always in June. Another noticeable point is that the range of colour is much more restricted than in the carnation, being almost confined to pinks and purples ".

The history in England of these attractive garden plants has been interestingly sketched in the work* here under notice. They were introduced to this country by Norman monks in the eleventh century. For many years they were used for flavouring wine and ale, as they had been since Pliny's day. There was apparently considerable development in the times of Elizabeth I and the Stuarts. The author records and describes examples of survivals of early varieties in British gardens.

The book is beautifully set in Monotype Caslon Old Face and is illustrated by eight coloured plates, printed in photolitho-offsets and by endpapers and paper sides in collotype. The latter are from specimens preserved in historical herbaria preserved in the Department of Botany at Oxford. The coloured plates, by Rory McEwen, are very pleasing. Both author and publisher may be congratulated on the production.

W. B. Turrill.

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* Old Carnations and Pinks, by C. Oscar Moreton, George Rainbird in association with Collins, 1955, £3.3.0.

NOTES ON AFRICAN STRYCHNOS* : III.

The late Miss E. A. Bruce†

Strychnos Floribundae *Duvign.* Ser. **Eufloribundae** *Duvign.*

This Series of the Section *Floribundae* shows the following salient features : -

> Unarmed small trees, shrubs or climbers with occasional simple tendrils. Corolla-tube campanulate, thinly to densely pubescent within towards the apex. Stamens inserted in the corolla sinuses, anthers exserted. Style long. Fruit small, globose, 1–2-seeded.

There is only one East African species that belongs to this Series, *S. usambarensis* Gilg, although the Angolan species, *S. welwitschii* Gilg, is very closely allied to it and, on the available material, it is very difficult to separate the two. Below I give a key to the species, explain my reasons for keeping them distinct and cite the synonymy involved.

Key to the Species.

Corolla-lobes usually 5, pilose at least at the base ; tube longer than the lobes ; anthers narrowly oblong, well exserted ; fruits not or scarcely stipitate within the calyx, up to 1 cm. diameter (Angola)
1. welwitschii

Corolla-lobes usually 4, glabrous, tube subequal to the lobes ; anthers subovate, shortly exserted ; fruits shortly but conspicuously stipitate, 1–1·8 cm. diameter (Eastern Africa ; Uganda–Natal)
2. usambarensis

1. Strychnos welwitschii *Gilg* in Engl., Bot. Jahrb. **17** : 573 (1893) ; Welw. Cat. **1** (**3**) : 703 (1898) excl. syn. *S. lucens* Bak. and *S. loandensis* Bak. ; Fl. Trop. Afr. **4** (**1**) : 524 (1903).

S. subscandens Bak. in Kew Bull. **1895** : 96 (Apr.–May 1895) ; Fl. Trop. Afr., *l.c.*

S. microcarpa Bak. in Bull. **1895** : 97 (1895) : Fl. Trop. Afr. **4** (**1**) : 525 (1903).

S. malifolia Bak. in Fl. Trop. Afr. **4** (**1**) : 525 (1903).

Angola. Luanda Province : between Quicuxe & Cacuaco, *Welwitsch* 4765 (holotype of *S. microcarpa* in K !, isotype in BM ! ; being also a syntype of *S. welwitschii*) ; 1858 (fr.), *Welwitsch* 6017 (syntype of *S. welwitschii* in K ! & BM !) ; May 1854 (fr.), *Welwitsch* 6018 (holotype of *S. subscandens* in K !, isotype in BM ! ; being also a syntype of *S. welwitschii*) ; (fr.), *Gossweiler* 493 ! ; Viana, 23 Mar. 1937 (fr.), *Gossweiler* 10613 ! ; 23 Nov. 1935 (fl.), *Gossweiler* 10517b ; Ambriz, Oct. 1872 (fl.), Monteiro s.n. (holotype of *S. malifolia* in K ! ; Zaire District : Peco, *Gossweiler* 8638 ! ; Cuanza North District : Golungo, Mar. 1855 (fr.), *Welwitsch* 4774 !

2. S. usambarensis *Gilg* in Engl. Pfl. Ost-Afr. **C** : 311 (1895) ; Fl. Trop. Afr. **4** (**1**) : 526 (1903) ; Tanganyika Check List **2** : 276 (1949).

S. micans S. Moore in Journ. Linn. Soc. **40** : 146 (1911) ; Verdoorn in Bothalia **3** : 587 (1939).

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* Continued from Kew Bull. **1955** : 127.

† The manuscript of this paper has kindly been prepared for the press by Mr. J. Lewis.—Ed.

Uganda. Karamoja District : Kaabong, 7 June 1942 (fl.), Dale 280 ! ; Toro District Kibale Forest, (fr.), *Dawe* 531 ! ; near Mount Mpanga, 23 Aug. 1906, *Bagshawe* 1174 !.

Kenya. Nairobi, 13 Mar. 1911 (fl.), *Battiscombe* 464 ! ; 20 Mar. 1932 (fl.), *van Someren* 1810 !

Tanganyika. Tanga District : 5 miles south-east of Ngomeni, 2 Aug. 1953 (fr.), *Drummond & Hemsley* 3607 ! ; Lushoto District : Mashewa, July 1893 (fr.), *Holst* 3582 (isotype of *S. usambarensis* in K ! & HBG !) & *Drummond & Hemsley* 3099 !

Portuguese East Africa. Maputo, 29 Jan. 1947, *R. M. Hornby* 2547 !

Southern Rhodesia. Chirinda Forest, Dec. 1905 (fl.), *Swynnerton* 125 ! (holotype of *S. micans* in BM, isotype in K !) ; 26 Oct. 1947, *Wild* 2238 ! *in Govt. Herb.* 17865.

Transvaal. Pretoria District : Elandsberg near Rust der Winter, 8 Dec. 1950, *Codd* 6297 ! ; Zoutpansberg District : Sibasa, 19 Dec. 1951, *van Warmelo* 51219/21 !

Natal. Durban, Mar. 1937 (fr.), *Marriott* 4 *in Nat. Herb.* 23198 ! ; Hlabisa, 3 Nov. 1938 (fr.), *Gerstner* 3104 !

It is difficult to come to any very satisfactory conclusions about the relationship of the above two species because the types are in different stages of development :—

S. malifolia (Angola) & *S. micans* (S. Rhodesia) in flower.

S. welwitschii (Angola) & *S. usambarensis* (Tanganyika) in young fruit.

S. malifolia & *S. micans* are distinct on the floral characters (see key & fig. 1).

S. welwitschii (particularly as represented by *Welwitsch* 6017 & 4765) and *S. usambarensis* are very similar in leaf size, shape and venation and in the type of branching and lenticellation of the twigs ; the only difference is in the fruit ; the Hamburg duplicate of *Holst* 3582 shows a distinct stipe, which is scarcely visible on the Welwitsch specimens, though these are in rather a younger stage (no mature fruits from Angola are available) ; those from Uganda, Tanganyika and South Africa also possess a stipe. Flowering material from the East Usambaras (*Greenway* 2897) compares very well with flowers from the type of *S. micans*, though the leaves are broader, a character which I do not consider important (flowering material from Uganda and Kenya is also similar) ; thus the flowering material from East Africa is not separable from *S. micans* and I consider that this species is a synonym of *S. usambarensis*. Furthermore on the floral evidence *S. usambarensis* appears to be distinct from *S. malifolia*. A specimen from Inhamitanga, Portuguese East Africa (*Simeo* 1200), however, has pubescent corolla-lobes, though the hairs are much shorter than those of *S. malifolia*. It is therefore possible that a gradation in pubescence occurs, but it will be necessary to examine further flowering material before this can be ascertained with certainty.

To return to the Angolan material, the types of *S. malifolia* and *S. welwitschii* both come from Luanda District but as one is in flower and the other in fruit true comparison is not possible. Both have the same type of lenticellation, twig colour, leaf shape and venation and I can find no valid reason for keeping them separate. To be really conclusive it is necessary for collectors to mark particular shrubs and collect both flowers and fruit from them so that complete material can be obtained.

Finally a few words on the taxonomy of *S. welwitschii*. This species was founded by Gilg in 1893 on the three *Welwitsch* specimens (Nos. 4765, 6017, 6018) and was described as an unarmed scandent shrub furnished with a few tendrils. In 1895, Baker in the Kew Bulletin

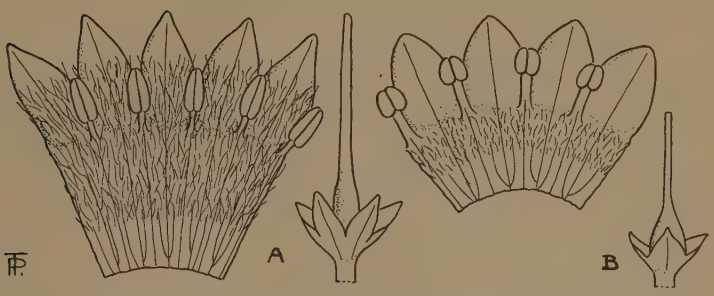


FIG. 1. Open corolla, calyx and pistil of (A) *S. malifolia* Bak. from *Monteiro* s.n. and (B) *S. micans* S. Moore from *Swynnerton* 125 ; all × 8.

separated out *Welwitsch* 4765 as an erect shrub without tendrils (*S. microcarpa*) and *Welwitsch* 6018 as sarmentose with tendrils (*S. subscandens*), and also described a third species (*S. loandensis*), based on *Welwitsch* 6016 (an immature specimen consisting of very young leaves and flower buds), as sarmentose with tendrils. This latter species shows a bifurcate tendril on the specimen at the British Museum (Nat. Hist.), though on the Kew material the tendril is simple ! It was placed as a synonym of *S. welwitschii* in Welwitsch's Catalogue (1898) but in view of the very poor and confusing nature of the material I feel it is better to disregard it. In 1903, in the Flora of Tropical Africa, Baker revised his ideas and reduced *S. subscandens* to synonymy within *S. welwitschii* and stated that *S. microcarpa*—" appears to be a form of the same species without tendrils". He thus came to the conclusion that the presence or absence of tendrils in this particular case was not of great value and that Gilg's conception of the species was correct ; I am also of this opinion. Duvigneaud*, however, apparently considers the species a mixture since he has treated the binomial *S. welwitschii* as a *nomen confusum* and discarded it in favour of *S. malifolia*.

Among the East African material, a specimen collected by *Drummond & Hemsley* (3607, described as a shrub with long thin branches tangled with other shrubs) also shows one tendril. This confirms that the relationship between *S. welwitschii* and *S. usambarensis* is very close and I feel that when our knowledge of these species is increased it is very probable that they may either become synonymous or *S. usambarensis* may be treated as a subspecies of *S. welwitschii*.

* Bull. Soc. Roy. Bot. Belge. **85** : 35 (1952).

Cultivating Wild Flowers.*—The British flora contains many species worth a place in flower gardens. One has, however, to confess that our list of native plants is a short one compared with that of some other countries. The great extent and the ecological diversity of the United States of America together with the climatic history correlated with the orography of the country have favoured the development of a numerically rich and structurally very diversified flora. Our British gardens owe much to introductions from North America. An account of Wild Flower Gardening, even if written for use in the U.S.A., is bound to be of interest and use in Britain. The book* on the subject here under notice, is well produced, has a readable text, and is convenient to handle. A special feature is provided by the thirty two coloured plates with two to four species per plate. A good deal of useful cultural information is given in the text. One wonders how the stocks of the "Native Plant Dealers", a list of whom with addresses is printed at the end of the general text, are maintained. It is to be hoped that permanent damage is not done to the native vegetation by their activities.

W. B. Turrill.

* Norman Taylor, Wild Flower Gardening, D. van Nostrand Company, Inc., Princetown, New Jersey, 1955, pp. 128, 32 coloured plates, 28/-.

Note on Caylusea abyssinica

The type specimen of *Caylusea abyssinica* (Fresen.) Fisch. et Mey. was originally described by Fresenius as *Reseda abyssinica* in his account of "Contributions to the Flora of Abyssinia" [Mus. Senck. **2,** 106 (1836)] and stated to be a Rüppell specimen from Abyssinia. This sheet was almost certainly destroyed during the war because the only specimen now in the Fresenius Herbarium is a sheet labelled "*Reseda abyssinica* cult. in h. bot." and consisting of fragmentary pieces devoid of either flowers or fruits. As the holotype therefore no longer exists, and in order to avoid confusion with the very poor specimen extant in the Fresenius Herbarium, I propose to choose *Schimper* 103 as the neotype. This specimen, named *Reseda abyssinica* on a printed label, was collected in Abyssinia on 28 Sept. 1837, shows well-preserved flowers and fruits and this Schimper number is widely distributed under a number of duplicates.

Joan Elffers.

NEW OR INTERESTING RECORDS OF AUSTRALASIAN BASIDIOMYCETES.

DEREK A. REID

During 1954 a consignment of fungi from the Forest Products Division, South Melbourne, Australia (hereafter abbreviated to F.P.S.M.) was received at Kew for naming, which included collections from Australia and New Guinea. These are listed below, together with a few records of Australian fungi received from other correspondents. Many of these fungi are new records for the countries concerned and others belong to poorly described or little known species, whilst four have had to be described as new, viz. :—*Aleurodiscus limonisporus* ; *Odontia lyndoniae* ; *Beenakia dacostae* ; and *Secotium gloriosum.* It was also found necessary to erect a new genus—*Beenakia* to accommodate *B. dacostae*, as this species differs so markedly from all others belonging to the centrally stipitate genera of the Hydnaceae.

APHYLLOPHORALES

THELEPHORACEAE

Aleurodiscus limonisporus *Reid*, sp. nov.

Sporophora orbiculata, demum saepe confluentia, usque ad 0·7 cm. diametro, margine leviter incurvato, hirsuto, pilis sericeis, albis radiatis ornato. *Superficies inferior* albida, sericeo-pubescens ; *Superficies hymenialis* siccitate pallida ochraceo-lutea. *Hyphae* 2·5μ latae, muris tenuibus, sine fibulis. *Basidia* magna, clavata usque ad 127μ longa et 15·5μ crassa, 2–4 sporis. *Sterigmata* 8–10μ longa. *Dendrophyses* carentes. *Paraphyses* laeves, cylindricae, 3μ crassae. *Sporae* hyalinae, laeves, amyloideae, limoniformes 16–20·8 × 9–10μ.

AUSTRALIA : on recently felled stump of (?) *Nothofagus cunninghamii*, causing a white rot, Cumberland Falls, Victoria, *Miss A. Miller*, 9.6.1954 [Herb. F.P.S.M. No. 4564]. (Typus).

This species, which has a waxy hymenium, closely resembles an effuso-reflexed *Stereum*, but is easily distinguished from members of this genus by its microstructure.

Cymatoderma lamellata (*Berk. & Curt.*) *Reid*, comb. nov.

Thelephora lamellata Berk. & Curt. in Amer. J. Sci. Series 2, **11,** 94 (1851).

Stereum caperatum (Berk. & Mont.) Mass. var. *lamellatum* (Berk. & Curt.) Cooke Handbook of Australian Fungi 182 (1892).

Stereum lamellatum (Berk. & Curt.) Burt in Ann. Mo. bot. Gdn **7,** 87 (1920).

Cladoderris lamellata (Berk. & Curt.) Pat. Essai Taxonomique 73, 1900.

Sporophore 3·5–30·0 cm. wide, 3·5–15·0 cm. high, either truly infundibuliform or pseudoinfundibuliform. In the latter case the fruit-body is formed by the growing together and fusion of the edges of a flabellate structure. This fusion is often incomplete, with the result that a small gap is left on one side at the point of junction between pileus and stipe. The fruit-body may be simple, or it may be formed by the fusion of several adjacent sporophores. The upper surface of the coriaceous

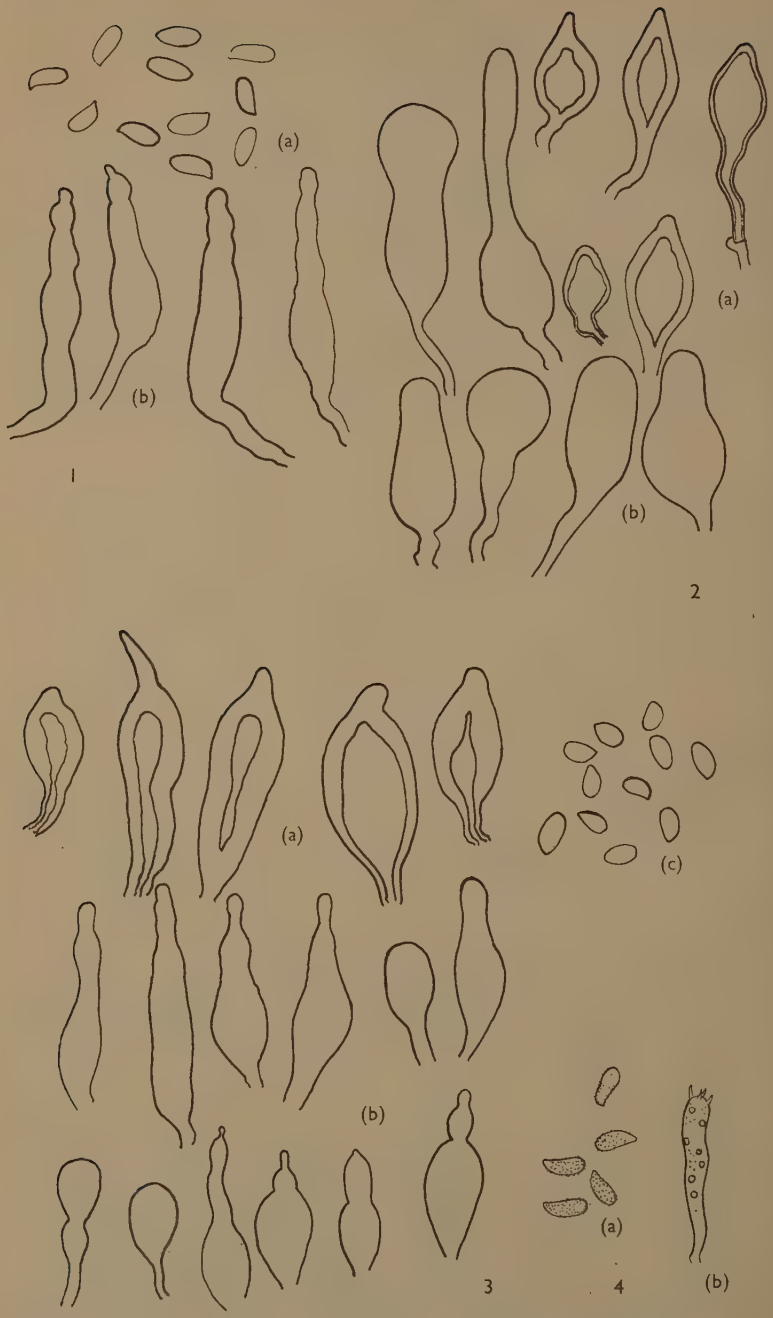


FIG. 1. *Cymatoderma caperata* (a) spores × 866. (b) gloeocystidia × 866. FIG. 2. *Cymatoderma lamellata* (a) cystidia × 866. (b) gloeocystidia × 866. FIG. 3. *Cymatoderma lamellata* (a) cystidia × 866. (b) gloeocystidia × 866. (c) spores × 866. FIG. 4. *Beenakia dacostae* (a) spores × 866. (b) basidium × 866.

pileus is covered by a very dense felt-like layer of tangled hairs which may reach a thickness of 0·5 cm. This layer is often very unevenly ridged owing to numerous underlying, radiating, knife-edged crests, which arise from the surface of the pileus. These crests are usually visible toward the margin of the fruit-body, but are best seen in old weathered specimens. The colour of the pileus when fresh is apparently dull cream [according to a note on a specimen, No. 4395, collected in the Fiji Islands by *A. C. Smith*, 1947, and wrongly determined as *Stereum caperatum* (Berk. & Mont.) Massee] but changes to buff on drying. The stipe, 1·5–6·5 cm. long, 0·3–1·8 cm. wide is usually well developed, but occasionally it may be very short and stout. It is always somewhat thickened toward the base, although this is chiefly due to an increase in the thickness of the felty-hirsute covering which is concolorous with that of the pileus. This felty layer may expand to form a superficial basal disc, but the stipe itself often extends into the substrate as a thick plug of tissue. The cream-coloured hymenial surface is devoid of papillae or warts, but is thrown into broadly undulating folds. *Spores* rarely present, but found on two specimens in the Kew Herbarium (Coomerong Island, Shoalhaven River, New South Wales, *F. A. Rodway*, No. 866, 3.9.1932 (see Fig. 3) ; Ignambi, New Caledonia, *R. H. Compton*, No. 1749). These are broadly elliptical 5–7 × 3–4μ, but exceptionally 7–8·5 × 3·5μ. *Hymenium* thickening, reaching 150μ. *Gloeocystidia* present, staining deeply in aniline blue in lactic acid. These are long, undulating, thin-walled bodies which narrow gradually toward their obtuse apices, but which sometimes show a rounded apical swelling or small finger-like protrusion. They arise at various levels in the thickened hymenium, but some arising in the context continue to grow at the same rate as the hymenium thickens, and extend throughout its total width. Those arising in the current hymenial layer appear as deeply staining globose or oval bodies, and frequently show an apical swelling or protrusion. In some specimens it is only possible to see these globose or oval bodies and in others only the long undulating type. However, specimens occur in which both types are present, together with all possible intermediates (see Fig. 3). These globose and oval structures must therefore be regarded as stages in the development of typical gloeocystidia. In some specimens it is impossible to demonstrate the presence of gloeocystidia, but as these thin-walled structures collapse very readily it is reasonable to assume that either climatic conditions during growth of the fungus, or conditions under which it has been subsequently dried and stored may be responsible. *Cystidia* always present. These very thick-walled structures vary in shape from ovate to lanceolate, and are often greatly prolonged apically in the form of a beak. The upper portions, however, are usually covered by a heavily encrusting deposit which is soluble in potassium hydroxide. They are of limited growth and are found at various levels in the hymenium. Those arising in the current basidial layer have appreciably thinner walls than those which become buried as the hymenium thickens, and may project up to 21μ. Occasionally almost the whole cystidium projects above the surface. They are of variable size, 15-65 × 9–23·4μ, including the beaks which are up to 26μ long. *Hyphal system* dimitic, consisting of very long, unbranched, thick-walled skeletal hyphae 2-5μ wide, which lack clamps, and thin-walled, branched generative hyphae 2–4μ wide which have

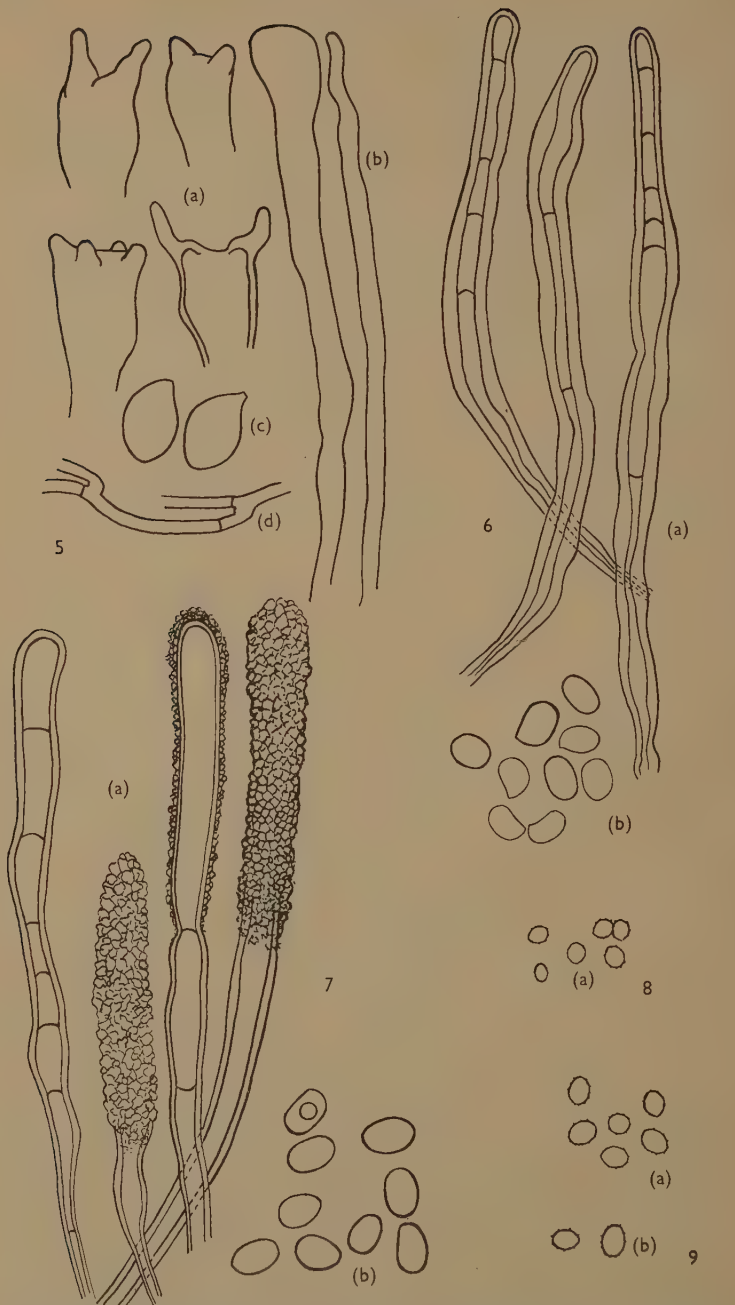


FIG. 5. *Aleurodiscus limonisporus* (a) basidia × 866. (b) paraphysis × 866. (c) spores × 866. (d) hypha × 866. FIG. 6. *Odontia lyndoniae* (a) cystidia × 866. (b) spores × 866. FIG. 7. *Odontia lyndoniae* (a) cystidia × 866. (b) spores × 866. FIG. 8. *Lentinellus ursinus* (a) spores × 866. FIG. 9. *Lentinellus hepatotrichus* (a) spores F.P.S.M. No. 3448 × 866 (b) spores from type specimen × 866.

clamps at the septa. There is a definite cuticular layer 26–65μ in thickness where the coralloid hyphae, densely compacted and entwined, have rather thick walls and clamps at the septa. From this layer arise the very long hairs which cover the upper surface of the pileus. These thick-walled hairs 3–4μ wide, have clamped septa at intervals along their entire length and a very narrow central lumen.

Australia : on long fallen branches, Toonumbar State Forest, New South Wales, *J. Tracey*, August 1951 [Herb. F.P.S.M. No. 2917].

This species has, hitherto, been much confused with **Cymatoderma caperata** (*Berk. & Mont.*) *Reid*, comb. nov. [*Thelephora caperata* Berk. & Mont.]. This confusion probably originated with Cooke (1892), when he recorded *Stereum caperatum* from Australia and at the same time reduced *S. lamellatum* to a variety of this species. Lloyd (1913) also confused these two fungi and stated that *S. caperatum* occurred in Brazil, West Indies, Samoa, Philippines, and Australia, as well as in the Southern United States. He added further to the confusion by wrongly stating that *S. caperatum* had " true metuloids, conical, rough, projecting 20–30 mic." It was Burt (1920) who first recognised that these two fungi were distinct and that the American species lacked the thick-walled cystidia so characteristic of the species occurring in the Pacific. He writes " Since Lloyd cited *S. caperatum* as occurring in Samoa, the Philippines, and Australia, it is possible that his observations on incrusted cystidia of *S. caperatum* were based on specimens from the Pacific region really referable to *S. lamellatum* rather than on the true *S. caperatum* of the American continent." On examination of the type specimen of *S. lamellatum* from the Fiji Islands he found " conical incrusted cystidia 6–12μ in diameter, protruding 12–25μ and subglobose spores 3–3½ × 3μ". His description of the spores, however, suggests those of a mould. Despite these observations Cunningham (1953) adopted the name *S. caperatum* for the Australasian fungus and cited *S. lamellatum* as a synonym. He also erroneously stated that the type of *S. lamellatum* was at Kew—" Under the cover of *Stereum lamellatum* are filed the type ex " Aru Island, Challenger Expedition ", etc., ..." whereas in fact the type specimen was collected in Fiji by the U.S. Exploring Expedition under C. Wilkes.

Apart from the different geographical distribution, *Cymatoderma lamellata* may be separated from *C. caperata* by the presence of thick-walled, ovate, encrusted cystidia, and broadly elliptical spores 5–7 × 3–4μ (those of *C. caperata* (see Fig. 1), are subcylindrical 8–11 × 3–4μ). Other differences are that the hymenium of *C. caperata* tends to reach a greater thickness than that of *C. lamellata*, and the gloeocystidia, which frequently appear more or less moniliform, are of correspondingly greater length.

Hydnaceae

Beenakia *Reid*, gen. nov.

Sporae ellipsoideae, brunneae, asperae minutissimae, sic ab aliis generibus Hydnacearum stipite ad partem pilei mediam affixo differt.

Beenakia dacostae *Reid*, sp. nov.

Pileus 1·0 cm. diametro, fulvus, aculeis minutissimis brunneis oblectus. *Stipes* ad partem pilei medium affixus, glaber, fulvus 2·0 cm. longus,

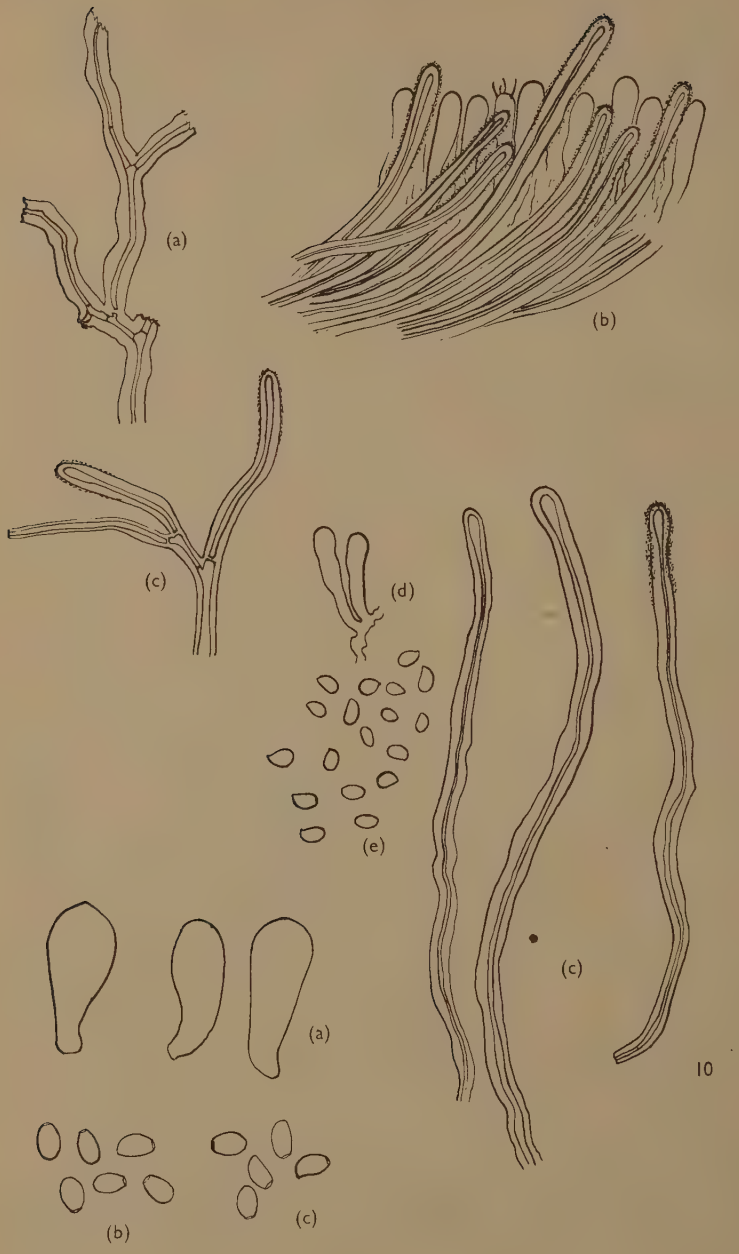


Fig. 10. *Irpex vellereus* (a) hypha × 866. (b) section through hymenium × 866. (c) cystidia × 866. (d) basidia × 866. (e) spores × 866. Fig. 11. *Hypholoma brunnea* (a) pleurocystidia × 866. (b) spores from type specimen × 866. (c) spores F.P.S.M. No. 3818 × 866.

0·15 cm. latus. *Hyphae subhymeniales* hyalinae, usque ad 3μ latae, muris tenuibus, et fibulis ornatae. *Hyphae contextae* hyalinae, 1·5μ latae, muris tenuibus, fibulis ornatae. *Basidia* quadrispora, clavata, 26·0–39·0 × 4μ, basi fibulata. *Sterigmata* usque ad 5μ longa. *Sporae* brunneae, ellipsoideae, 6–9 × 2·5–3μ, asperis minutissimis ornatae.

AUSTRALIA : On rotten limbs and branches in wet forest, Beenak, Victoria, *E. W. B. Da Costa*, 16.7.1948 [Herb. F.P.S.M. No. 2033]. (Typus).

Phellodon niger (*Fr.*) *Karst.* in Rev. mycol., Toulouse **31,** 19 (1881).

Hydnum nigrum Fr. Syst. Myc. **1,** 404 (1821).

Calodon niger (Fr.) Quél. Ench. Fung. 191 (1886).

AUSTRALIA : amongst debris of the forest floor, Healesville, Victoria, *Jagdishwar Nath*, 5.6.1954 [Herb. F.P.S.M. No. 4546].

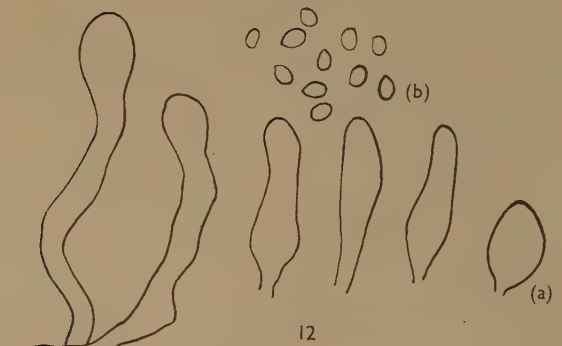
For a full description see Bourdot & Galzin (1928), and Donk (1933).

Irpex vellereus *Berk. & Br.* in J. Linn. Soc. (Bot.) **14,** 61 (1873).

Sporophore broadly effused with determinate margin ; hymenium covering crowded hydnoid spines, up to 0·15 cm. in length, appearing purple to brown with mauve and buff shades when fresh, but drying violaceous-buff. *Hyphal structure* apparently monomitic, consisting of thick-walled, freely branched, hyaline hyphae, 4–9μ wide, lacking clamps at the septa, and with narrow lumena. *Cystidia* very abundant, arising in the context of the needles as terminal modifications of ordinary thick-walled hyphae, curving into the hymenium, where they either remain entirely immersed or project up to 30μ above the basidia. These long, narrow, thick-walled, cylindrical structures, 3–5μ in diameter, 25 127μ in length, have their apices covered by a fine encrusting deposit which is soluble in potassium hydroxide. *Basidia* 4-spored, 13–27 × 3·5–5μ. *Spores* hyaline, smooth, elliptical, 4·5–6 × 2·5–3μ.

AUSTRALIA : on long fallen trunk of *Eucalyptus baxteri*, Heathmere, Victoria, *P. E. Finck*, 2.2.1954 [Herb. F.P.S.M. No. 4365]. This is the first Australian record of *I. vellereus*.

The Australian material has been compared with the type specimen which was collected in Ceylon, and found to agree well in all details. Talbot (1954) listed *I. vellereus* as a synonym of *I. dregeanus* (Berk.) Talbot but according to his description of this species (1951) under the name *Lopharia dregeana* (Berk.) Talbot, it differs from both the Ceylon and Australian collections in spore size, and other characters. The type specimen is sterile but scanty spores were found on a sporophore collected by T. Petch (No. 6045) at Hakgala, Ceylon, April 1919, which agreed with those of the Australian gathering i.e. :—4·5–6 × 2·5–3μ. Talbot (loc. cit.) gives the spore size of *I. dregeana* as 6·5–7 × 4·5–5μ. Other differences are apparent in the length and width of the cystidia, thus, in the Ceylon and Australian specimens these are 3·5 -5μ wide, whilst in *I. dregeana* they are (5)–6–8μ wide. Less importance is attached to differences in length of these organs, as this is a very variable character dependent upon their depth of origin and position on the needles. In view of these differences it was decided to adopt the name *Irpex vellereus*



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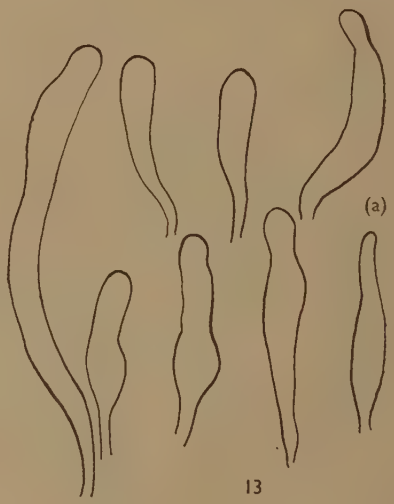

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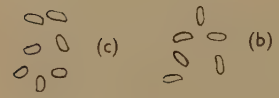

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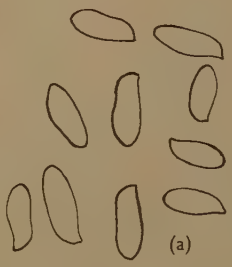

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FIG. 12. *Irpex calcareus* (a) gloeocystidia × 866. (b) spores × 866. FIG. 13. *Irpex calcareus* (a) gloeocystidia from type specimen × 866. FIG. 14. *Pavillus olivaceo-flavidus* (a) hypha from context × 866. (b) spores × 866. (c) spores from type specimen × 866. FIG. 15. *Phylloporus infundibuliformis* (a) spores × 866.

for the Australian fungus, whilst recognising its very close relationship with *Irpex dregeana*. Since writing the above description a further Australian specimen has been received :—Bullahdelah, New South Wales, August 1919, Ex-Herb. J. B. Cleland. This differs from the Heathmere collection in being pileate, but is otherwise indistinguishable.

Irpex calcareus (*Cke. & Massee*) *Wakef.* in Bull. Misc. Inf., Kew 367 (1915).

Hydnum calcareum Cke. & Mass. in Grevillea **21,** 38 (1892).

Fructification broadly effused with distinct margin, up to 0·8 cm. thick, of chalky consistency, drying buff coloured ; composed of numerous, crowded, fine needles, which are often united for most of their length, becoming free toward their acute apices. In some specimens they are fused together in large conical groups, giving the appearance of a layer of needles borne on a thick subiculum, but on cut surfaces the true construction can be clearly seen. *Hyphal structure* monomitic, consisting of thin-walled, branched generative hyphae, 2–2·5μ in diameter, with clamps at the septa. *Gloeocystidia* abundant, arising deep in the context of the needles and curving into the hymenium, where they may project slightly above the basidia. They are of variable shape, mostly clavate or sub-cylindrical, up to 80μ in length and 11μ in width. *Spores* subglobose to broadly elliptical 3–4·5 × 2·5–3·5μ. No spores were found on the type specimen, although the original description stated that they were 3 × 1·5μ.

Australia : on fallen trunk, Kangaroo Ground, Victoria, *Mrs. E. M. Davies*, 12.7.1953 [Herb. F.P.S.M. No. 3643]. Other Australian collections in Herb. Kew are the type " On bark, Victoria, *Martin*, 1027 " and " Katoomba, Blue Mountains, New South Wales, *W. N. Cheesman*, 1914."

The following collections are also preserved in Herb. Kew. :— " Weld Hill, Kuala Lumpur [Malaya], *M. Noor*, 16.1.1920." " Njala (Kori) [Sierra Leone], on dead branch of *Calthormion dinklagei*, *F. C. Deighton*, M. 4898, 22.10.1952."

Mycoleptodon ochraceus (*Pers. ex Fr.*) *Pat.* Essai Taxonomique 117 (1900).

Hydnum ochraceum Pers. ex Fr. Syst. Myc. **1,** 414 (1821).

Leptodon ochraceus (Pers. ex Fr.) Quél. Fl. Myc. Fr. 441 (1888).

Australia : on long fallen limbs and branches of *Eucalyptus muelleriana*, Ballarat, Victoria, *N. E. M. Walters*, 23.4.1953 [Herb. F.P.S.M. No. 3110] ; on long fallen limbs of *Acacia dealbata*, Tarra Valley Park, *Mrs. K. Healey*, 3.6.1954. [Herb. F.P.S.M. No. 4590A].

For a full description see Bourdot & Galzin (1928), and Talbot (1951).

Odontia arguta (*Fr.*) *Quél.* Fl. Myc. Fr. 435 (1888).

Hydnum argutum Fr. Syst. Myc. **1,** 424 (1821).

Australia : on long fallen branches of *Eucalyptus muelleriana*, Ballarat, Victoria, *N. E. M. Walters*, 23.4.1953 [Herb. F.P.S.M. No. 3101].

For a full description see Bourdot & Galzin (1928), and Miller (1934).

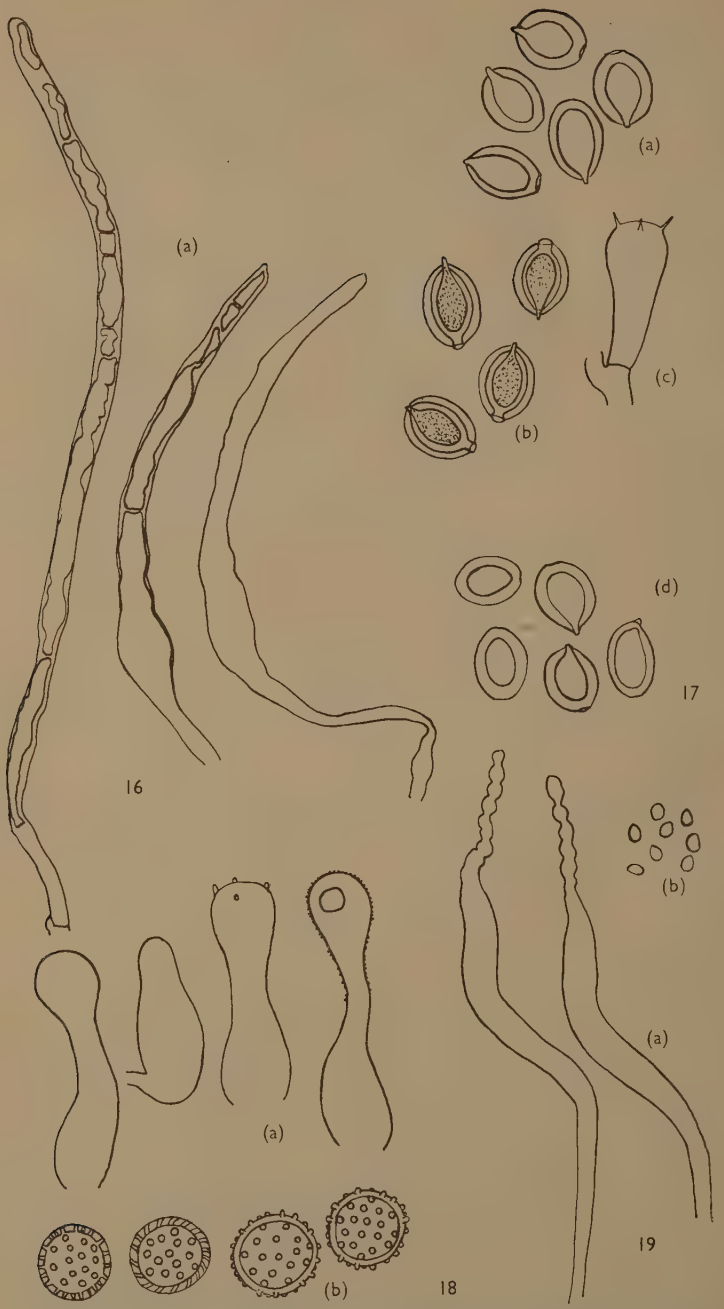

Fig. 16. *Sarcodontia isidioides* (a) gloeocystidia from type specimen × 866. Fig. 17. *Secotium gueinzii* (a) immature spores × 866. (b) mature spores × 866. (c) basidium × 866 (d) spores from type specimen × 866. Fig. 18. *Secotium gloriosum* (a) basidia × 866. (b) spores × 866. Fig. 19. *Sarcodontia isidioides* (a) gloeocystidia × 866. (b) spores × 866.

Odontia lyndoniae *Reid*, sp. nov.

Sporophorum ochraceo-cremeum, resupinatum, aculeis minutis, tenuibus, subulatis, et apicis fimbriatis, 0·05 cm. longis ornatum ; *Hyphae* hyalinae 3–5μ latae, fibulatae, muris tenuibus ; *Cystidia* elongata plus minus cylindrica vel fusiformia, usque ad 250μ longa, 9μ lata, septata, muris crassis, granulis incrustata. *Sporae* 7–10 × 5·5–6·5μ, ovatae, hyalinae.

Australia : on the base of dead *Salix* sp. in wet forest, Leongatha, Victoria, *Mrs. E. Lyndon*, 9.6.1953 [Herb. F.P.S.M. No. 3458]. (Typus); on *Pinus* sp. forming the timber of an old building, Leongatha, Victoria, *Mrs. E. Lyndon*, 24.6.1953 ; on *Pinus radiata*, Holloways Plantation, near Mount Gambier, South Australia, *Miss H. Purnell*, May 1952.

In the Mount Gambier gathering the cystidia are not incrusted (see Fig. 6), but in all other respects it agrees with the type collection.

Sarcodontia isidioides (*Berk.*) *Reid*, comb. nov.

Hydnum isidioides Berk. in Hooker's London Journ. Bot., **4,** 58 (1845).

Sporophore effused, consisting of crowded ochraceous needles, up to 0·4 cm. long, on a whitish subiculum. *Hyphal structure* monomitic ; hyphae 2–3μ wide, thin-walled, with clamps at the septa. *Gloeocystidia* present, arising as apical modifications of thin-walled conducting elements, with highly refractive contents, 5μ in diameter. The subcylindrical gloeocystidia which frequently have moniliform apices and swollen bases up to 10μ in width, may or may not project above the hymenial surface. *Spores* hyaline, smooth, subglobose 2·5–3 × 2–2·5μ.

Australia : on *Atherospermum moschatum*, Powelltown, Victoria, *E. W. B. Da Costa*, 20.4.1949 [Herb. F.P.S.M. No. 2169] ; on long fallen trunk of *Eucalyptus regnans*, Powelltown, Victoria, 18.7.1950 [Herb. F.P.S.M. No. 2572B].

This species is very closely related to *Hydnum macrodon* Pers. ex Fr. differing only in spore size.

Mycoacia subceracea (*Wakef.*) *G. H. Cunn.* in Proc. Linn. Soc. N.S.W. **77,** 294 (1953).

Acia subceracea Wakef. in Trans. roy. Soc. S. Aust. **54,** 155 (1930).

Sporophore bright mustard colour when fresh. *Cystidioles* thin-walled, subulate, or with minute apical projections.

Australia : on long fallen branches of a *Eucalyptus* sp., Ballarat, Victoria, *N. E. M. Walters*, 23.4.1953 [Herb. F.P.S.M. No. 3099].

For a full description see Wakefield (loc. cit.).

AGARICALES

Agaricaceae

Armillaria mellea (*Vahl. ex Fr.*) *Kummer* De Führer in die Pilzkunde 134 (1871).

Spores 8–11 × 5·5–8μ, slightly larger than in European material (7·5–9 × 5·5–7μ).

AUSTRALIA : on stump of a *Eucalyptus* sp., Woolgoolga, New South Wales, *H. J. Cann*, 8.6.1954 [Herb. F.P.S.M. No. 4580].

For a full description see Cleland (1934), Lange (1935), etc.

Lentinellus hepatotrichus (*Berk.*) *Reid*, comb. nov.

Lentinus hepatotrichus Berk. Fl. Tasm. **2,** 249 (1860).

Pleurotus hepatotrichus (Berk.) Cleland Toadstools and Mushrooms **1,** 89 (1934).

Acanthocystis hepatotrichus (Berk.) Singer in Ann. mycol., Berlin **41,** 148 (1943).

Pileus sessile, up to 2·5 cm. broad, liver-coloured when dry, tomentose, but becoming glabrous toward margin with age. *Gills* drying ochraceous-brown, distant, with a conspicuously dentate edge. *Gill trama* consisting of thin-walled elements, together with very numerous thin-walled oleiferous hyphae 4–8μ in diameter, some of which curve into the hymenium. *Spores* subglobose, hyaline, minutely roughened, strongly amyloid, 5–6 (6·5) × 4–4·5 (5)μ.

AUSTRALIA : on live trunk of *Eucalyptus rudis*, Chittering Lakes, Western Australia, *J. Gentilli*, 7.6.1953 [Herb. F.P.S.M. No. 3448].

This species, originally described from Tasmania on Stringy-bark Gum-tree (*Eucalyptus* sp.), belongs to the section *Pleuroti* (Fr.) Singer of the genus *Lentinellus*. It has been recorded from South Australia by Cleland (1934) under the name *Pleurotus hepatotrichus*, but his fungus is quite different from that of Berkeley, and is as Singer (1951) rightly suggested a *Hohenbuehelia*. The above would thus seem to be the first record of the true *Lentinellus hepatotrichus* from the Australian mainland.

Lentinellus ursinus (Fr.) Kühner, which also occurs in Australia, is closely related to the above fungus, but differs in its crowded gills and smaller amyloid spores (3·5–4·5 (5) × 3·5–4μ). (Fig. 8).

Panellus stipticus (*Bull. ex Fr.*) *Karst.* in Hattsv., Bidr. Finl. Nat. Folk **32,** 96 (1879).

Panus stipticus (Bull. ex Fr.) Fr. Epicrisis 399 (1838).

Panus saccharinus Berk. Fl. Tasm. **2,** 250 (1860).

Pileus drying cinnamon-brown in one collection, and pale ochraceous in the other. *Context* consisting of a number of zones, the uppermost of which, 8–10μ in thickness, forms the surface of the cap, and is composed of densely compacted, deeply staining, thin-walled, narrow hyphae, 1·5 2μ in diameter, of which the majority lie horizontally. Beneath this is a zone 54–65μ in thickness, formed of very loosely entwined, thin-walled hyphae, 2–3μ in width, with clamps at the septa. Below this is a zone 208–221μ in thickness, in which the densely compacted hyphae, 3–8μ in diameter, have swollen, gelatinised walls, and often more or less vertical orientation. This in turn is followed by a layer 520μ in thickness, formed of loosely interwoven hyphae, 2–8μ in width, some of which have thin walls with clamps at the septa, whilst others have somewhat thickened gelatinised walls. *Gills* interveined, of more than one length, consisting of a trama formed of parallel hyphae with gelatinised walls,

flanked by subhymenia 8–13μ wide, upon which the basidial layers 13–18·2 μ are borne. *Gill edge* sterile, formed of long, narrow, thin-walled, hair-like hyphae, 2–2·5μ in diameter, which often branch and may appear somewhat nodulose. There are also other thin-walled cystidial elements present, 4–5μ in width, which have pointed apices. *Spores* smooth, elliptical, hyaline, amyloid, 4–5 × 2–2·5μ.

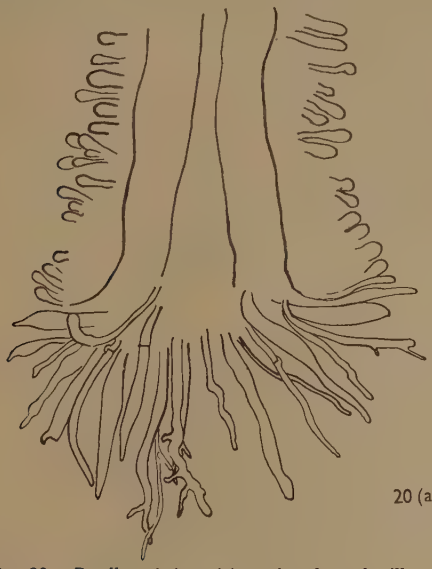

Fig. 20. *Panellus stipticus* (a) section through gill × 866.

Australia : on long fallen trunk of *Eucalyptus regnans* in damp mountain forest, Mount St. Leonards, Victoria, 13.4.1949 [Herb. F.P.S.M. No. 2150.A] ; Tallangatta, Victoria, *N. D. Endacott*, August 1953 [Herb. F.P.S.M. No. 3808].

For a full description of the macroscopic features of this fungus see Lange (1936).

Pleurotus ostreatus (*Jacq. ex Fr.*) *Kummer* De Führer in die Pilzkunde, 105 (1871).

Australia : on Milky Pine timber (probably imported from Queensland), Melbourne, Victoria, *A. Gordon*, 6.3.1953 [Herb. F.P.S.M. No. 3080] ; South Western Australia, *L. N. Weston*, November 1953 [Herb. F.P.S.M. No. 4254].

Lentinus fasciatus *Berk.* in Hooker's Journ. Bot. **2,** 146 (1840).

Australia : on trunk, limbs, and branches of a dead *Acacia* sp., Yeeda Station, near Derby, North Western Australia, *R. G. Lukins*, 23.7.1953 [Herb. F.P.S.M. No. 3731].

New Guinea : on logs of *Intsia bijuga* used in wharf maintenance, Lae, *A. Floyd*, 3.1.1954 [Herb. F.P.S.M. No. 4351].

For a full description see Cleland (1934).

Lentinus pergamenus *Lév.* in Ann. Sci. nat. Series III, **5,** 117 (1846).

New Guinea : on timber of *Mangifera minor*, Lae Botanic Gardens, *A. Floyd*, 31.12.1953 [Herb. F.P.S.M. No. 4359].

Lentinus strigosus (*Schw.*) *Fr.* Syst. Orb. Veg. 77 (1825).

Australia : on long fallen branches of a tree—probably *Cerbera dilatata*, Danbulla, Atherton, North Queensland, *K. J. White*, 25.9.1953 [Herb. F.P.S.M. No. 4157].

For a full description see Dennis (1950).

Lentinus tigrinus (*Bull.*) *Fr.* f. **squarrosulus** (*Mont.*) *Pilát* in Ann. mycol., Berlin **34,** 130 (1936).

Lentinus squarrosulus Mont. in Ann. Sci. nat. Series II, **18,** 21 (1842).

New Guinea : on dead branches, Saga, Yodda Valley, Northern Division, Papua, *Dr. R. D. Hoogland*, 19.9.1953 [Herb. F.P.S.M. No. 4467].

Hypholoma brunnea (*Massee*) *Reid*, comb. nov.

Flammula brunnea Massee in Trans. Proc. N.Z. Inst. **31,** 300 (1899).

Pileus 4–5 cm. or more in diameter, dark olive brown to nearly black when fresh, smooth above, plane, but margin occasionally inrolled. *Stipe* up to 6 cm. in length, hollow, glabrous, concolorous with cap. *Flesh* very thin, silky, fibrous, ochraceous, drying yellowish, homogeneous with that of stipe. *Gills* adnate, interlaminated, 0·5 cm. wide, olive-tinted cinnamon, dusky. *Pleurocystidia* present, 25–32 × 11–12μ, clavate, with brown contents. *Spores* brown under the microscope, elliptical, monoguttulate, with well defined apical germ-pores, 6–7·5 × 3·5–4μ (7–8 × 4–4·5μ in the type collection).

Tasmania : caespitose, on deep seed boxes, made from *Pinus* sp., the timber of which had been steam sterilized, Hobart, *E. G. Wingrave*, May and August 1953 [Herb. F.P.S.M. No. 3818].

This fungus which is a problem to nurserymen in Tasmania, was hitherto known only from New Zealand.

Crepidotus hepatochrous (*Berk.*) *Sacc.* Syll. Fung. **5,** 877 (1887).

Australia : A note sent with the specimen states that details of the collector have been lost, but that the same species has been gathered on at least three occasions from Acheron Way, Victoria, and Belgrave, Victoria, always growing on *Eucalyptus obliqua*. Pilát (1950) gives the range of spore size in the type material as 6·6·7 (7) × 5·3–5·6μ, but I find the range of size to be 6·7 × 4–4·5μ in both the type and the Australian material received from F.P.S.M. The spores are also shorter and broader than figured by Pilát (loc. cit.).

Paxillus olivaceo-flavidus (*Cke. & Massee*) *Reid*, comb. nov.

Panus olivaceo-flavidus Cke. & Massee in Grevillea **16,** 1 (1887).

? Paxillus aureus Lloyd in Mycological Writings **5,** 595 (1916).

Sporophore sessile, consisting of numerous, confluent, imbricate pilei, together with resupinate merulioid patches on the lower surface of the substrate. Upper surface brownish-fawn, cottony, becoming minutely tomentose toward the enrolled margin. *Gills* repeatedly forked, appearing almost poroid in places, with an irregularly corrugated or wrinkled surface, which when seen from above gives them a very characteristic wavy appearance, drying dark brown. *Context* yellowish-brown, formed of thick-walled, irregularly swollen, hyaline hyphae, up to 13μ in diameter. The surface of the pileus, however, is formed of narrow hyphae, 2–3μ in width, with prominent clamps at the septa. *Cystidia* absent. *Spores* subcylindrical, to slightly allantoid, hyaline, 3–4 × 1–1·5μ.

Australia : on fallen stump of *Pinus radiata*, Kilsyth, Victoria, *N. E. M. Walters*, 17.4.1953 [Herb. F.P.S.M. No. 3092].

The hymenium of this species has a strong resemblance to that of certain species of *Merulius*—a feature noted by Lloyd (loc. cit.) who wrote in his description of *Paxillus aureus* " In its habits, appearance, colour, context and spores this is so close to *Merulius aureus*, that there is a suspicion in my mind it is a hymenial variant of it, but no similar plant occurs in Europe."

It is certainly very closely related to *Paxillus curtisii* Berk., known previously only from North America, which differs in its wider spores (3–4 × 1·5–2μ). The difference between the two species is so slight as to suggest that the Australian species may be merely an isolated geographical race of *P. curtisii*. The occurrence in India of specimens of *P. curtisii*, with spores 3–4 × 2μ, provides some evidence for this view.

Paxillus aff. **panuoides** *Fr.*

This collection closely resembles *P. panuoides*, but has smaller brown spores, 3–4 × 2·5μ, whilst that species has spores 4–6 × 3–4·5μ. There is also a difference of host as *P. panuoides* occurs exclusively on coniferous wood in America and Europe, whereas the Australian collection was growing on *Eucalyptus regnans*.

Australia : on *Eucalyptus regnans*, *D. Ashton*, 26.7.(?)1954 [Herb. F.P.S.M. No. 3742].

For a full description of *P. panuoides* see Singer (1946), Lange (1939), etc.

Boletaceae

Phylloporus infundibuliformis (*Clel.*) *Singer* in Farlowia **2,** 284 (1945).

Paxillus infundibuliformis Cleland in Trans. Roy. Soc. S. Aust. **51,** 304 (1927).

Sporophore drying cinnamon brown. *Cystidia* not seen. *Spores* 11–15·6 × 4–5μ.

Australia : on the ground, Mansfield, Victoria, *D. W. M. Paine*, 12.5.1953 [Herb. F.P.S.M. No. 3221].

For a full description see Cleland (loc. cit.).

HYMENOGASTRALES

Secotium gueinzii *Kunze* in Flora, Jena **23,** 321 (1840).

Sporophore 3–6 cm. wide, 1·3–2·5 cm. high excluding stipe, convex with a central depression, and whitish surface breaking up into numerous thick imbricate scales. *Stipe* central, 2–3 cm. long, 1·5–2·5 cm. wide, equal or attenuated at the base, whitish, extending through gleba as a thick-walled cylindrical columella, which may be either hollow or irregularly cellular, fusing above with peridium. *Gleba* varying from brownish-buff when immature to dark brown, irregularly cellular with elongated cavities formed by anastomosing tramal plates ; entirely enclosed at first but later exposed when thin floccose tissue uniting the peridium with the stipe ruptures. *Basidia* 4-spored, clavate, 26–53·6 × 12–15·6μ. *Spores* thick-walled, 11–15 × 9–10·6μ (exceptionally up to 18 × 13·6μ), subglobose to very broadly elliptical, with a distinct apical germ-pore, and basal apiculus, at first almost hyaline but becoming dark brown when mature.

Australia : Broken Hill, New South Wales, *J. H. Morris*, No. 514 (University of Adelaide Herb. No. 3764).

The spores of the above specimens were compared with those of the type in the Kew Herbarium, and were found to agree well. Those of the type are rather pale and immature, 12–15·6 × 9–11μ, which is slightly larger than the measurements given by Bottomley (1948) for the spores of the South African material she has examined.

Secotium gueinzii was first reported from Australasia by Cunningham (1924), who based his information on a specimen sent to him from Tasmania by L. Rodway, which had been named by G. C. Lloyd. The latter (1925), however, wrote " There is some clerical mistake, perhaps on my part, in reporting to Mr. Rodway, for I never in my mind considered *Secotium guinzii* to grow in Tasmania and never confused it with the South African plant. I may have confused the name *Secotium guinzii* with the name *Secotium gunnii*, but I have no recollections of ever having received *Secotium gunnii* from Mr. Rodway and have no specimens from him now in my museum." Cunningham (1944) referring to the same Rodway specimen states " . . . . on examination of the specimen I found it to be an agaric parasitized by a hyphomycete." Thus the collection from New South Wales, described above, is the first authentic record of this species from Australasia.

Secotium gloriosum *Reid*, sp. nov.

Peridium convexum, laeve, 2·5 cm. diametro, fusco-brunneum, in vivis pallido-griseum. *Stipes* ad partem pilei medium affixus, brunneus, 1·5 cm. longus, 0·3 cm. latus, baso inflato radicato, 2·0 cm. longo, 0·7 cm. lato. *Gleba* cellulosa, fulva. *Lamellae tramae* 140 250μ crassae, hyphae glutinosae. *Basidia* quadrispora, in collum longum angustata. *Sterigmata* 3–4μ longa. *Sporae* spinulosae, globosae 11–14μ spinis excludentibus, spinae 1–2μ longae, pallidae brunneae.

Australia : in wet forest, on base of rotten standing tree, Mount Glorious, Queensland, *E. J. Smith*, 17.4.1954 [Herb. F.P.S.M. No. 4469]. (Typus).

LYCOPERDALES

Lycoperdon subincarnatum *Peck* in Ann. Rep. New York State Mus. nat. Hist. 24th Rep. 82 (1872).

New Guinea : on long fallen, charred branches, north slope of Mount Lamington, Northern Division, Papua, *Dr. R. D. Hoogland*, 15.7.1953 [Herb. F.P.S.M. No. 4448]. This would seem to be the first record of this fungus from New Guinea. For a full description see Cunningham (1944), & Smith (1951).

References :—

Bottomley, A. M. (1948). Gasteromycetes of South Africa. Bothalia **4,** 473–810.

Bourdot, H. & Galzin, A. (1928). Hyménomycètes de France, Paris.

Burt, E. A. (1920). The Thelephoraceae of North America. XII. *Stereum*. Ann. Mo. bot. Gdn **7,** 81–248.

Cleland, J. B. (1934). Toadstools and Mushrooms and other Larger Fungi of South Australia, Adelaide. **I,** 1–178.

Cooke, M. C. (1892). Handbook of Australian Fungi, London.

Cunningham, G. H. (1924). A Critical Revision of the Australian and New Zealand Species of the Genus *Secotium*. Proc. Linn. Soc. N.S.W. **49,** 97–119.

Cunningham, G. H. (1944). The Gasteromycetes of Australia and New Zealand, Dunedin, New Zealand.

Cunningham, G. H. (1953). Revision of Australian and New Zealand Species of Thelephoraceae and Hydnaceae in the Herbarium of the Royal Botanic Gardens, Kew. Proc. Linn. Soc. N.S.W. **77,** 275–299.

Dennis, R. W. G. (1950). *Lentinus* in Trinidad B.W.I. Kew Bull. 321–333.

Donk, M. A. (1933). Revision der Niederländischen Homobasidiomycetae-Aphyllophoraceae, Amsterdam-Haarlem.

Lange, J. E. (1935). Flora Agaricina Danica, Copenhagen, **I.**

Lange, J. E. (1936). Flora Agaricina Danica, Copenhagen, **II.**

Lange, J. E. (1939). Flora Agaricina Danica, Copenhagen, **IV.**

Lloyd, G. C. (1913). Mycological Writings, Cincinnati, **4.**

Lloyd, G. C. (1925). Mycological Writings, Cincinnati, **7.**

Miller, L. W. (1934). The Hydnaceae of Iowa, II. The Genus *Odontia*. Mycologia, **26,** 13–32.

Pilát, A. (1950). Revision of the Types of some Extra-European Species of the Genus *Crepidotus* Fr. Trans. Brit. mycol. Soc. **33,** 215–249.

Singer, R. (1946). The Boletineae of Florida with notes on Extralimital Species IV. The Lamellate Families (Gomphidiaceae, Paxillaceae, and Jugasporaceae). Farlowia **2,** 527–567.

Singer, R. (1951). The "Agaricales" (Mushrooms) in Modern Taxonomy. Lilloa, **22,** 1–832.

Talbot, P. H. B. (1951). Studies on some South African Resupinate Hymenomycetes. Bothalia, **6,** 1–116.

Talbot, P. H. B. (1954). On the Genus *Lopharia* Kalchbrenner & MacOwan. Bothalia **6,** 339–346.

A Text-book of General Botany.*—This is an excellent introduction to the morphology and physiology of plants—divisions of botany that are basic to the more advanced studies of classification, ecology, and phytogeography. The arrangement of the contents is logical according to long established tradition in separating, for teaching purposes at least, structure from function. One would like to see a modern text-book in which such a dichotomy was obliterated. Under morphology, the structure of the cell is first dealt with. Tissues are then considered and the form or build-up of organs is described in some detail. An entirely separate section deals with reproduction. In this *Bryophyta*, *Pteridophyta*, *Gymnospermae*, and *Angiospermae* are accounted for separately.

There are three main sections under the heading physiology : change of materials, change of form, and change of place or position. The first is concerned with chemical make up and the chemical and physical exchanges of substances between plants and their environment—with nutrition in the widest sense. The second is involved with all the problems of growth and development, including those heredity of and with changes which may result in evolution. The third deals with movements of plants and plant organs.

In all parts of the book there are many black and white text illustrations, some original but many taken from the publications of other authors. In addition to the 637 text figures there are 7 photographic plates. The references to literature are rather meagre and are mostly to German books. There is a clearly arranged list of contents and a good index.

British students should find this text-book of considerable use. First, the German is relatively straightforward and should afford not too difficult practice in translation. Secondly, it covers the general field of plant morphology and physiology very adequately and with admirable balance between the different sections, if one allows for the artificial analysis into such sections—an analysis that has obvious advantages but some dangers. Thirdly, in addition to generally accepted descriptive knowledge, it tends to emphasize contributions by German botanists some of whose work is probably not known to many in this country. This is not to pretend that the German work is superior to that of British, American, and other botanists in corresponding fields but it must be given due consideration. The output of botanical literature is now so vast that it is impossible to read all original books and papers and well compiled text-books are useful even to the professional specialist as well as to the undergraduate. W. B. Turrill.

* Hermann von Guttenberg : Lehrbuch der allgemeinen Botanik, Akademie-Verlag, Berlin, DM 25, 1955, pp. 672, plates 7.

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